TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS

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I hereby declare that the thesis entitled **"TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS"** submitted towards partial fulfillment of the requirements for the award of **MS GENERAL SURGERY** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Atul Mishra,** Professor, Department of General Surgery, **Dr. Ravinder Pal Singh**, Professor, Department of General Surgery & **Dr. Amandeep Singh Nar**, Professor, Department of General Surgery. No part of this thesis has formed the basis for the award of any degree previously.

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Dedicated

to

my family

&

Teachers

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ABBREVIATIONS

VATS:	Video Assisted Thoracoscopic Surgery
NRS:	Numerous Rating Scale
FEV1:	Forced Expiratory Volume in 1 second
FVC:	Forced Vital Capacity
Pao2:	Partial Pressure Of Oxygen In The Arterial Blood
Sao2:	Saturation Of Oxygen In The Arterial Blood
VAS:	Visual Analogue Scale
ABG:	Arterial Blood Gas
CT:	Computed Tomography
F:	Female
M:	Male
T.B:	Tuberculosis
BPF:	Bronchopleural Fistula
mins:	Minutes
ml:	Millilitre
NSAIDS:	Non Steroidal Inflammatory Drugs
mg:	Milligram

ABSTRACT

INTRODUCTION: Since its introduction VATS has evolved as a popular surgical approach for various thoracic diseases with very promising results. Despite several studies implying better surgical outcomes and decreased morbidity with VATS, the debate still prevails regarding the safety and efficacy of the procedure.

OBJECTIVE: To study the clinical spectrum and outcomes of VATS pulmonary resections.

MATERIALS AND METHODS: This study was conducted in department of Surgery, Dayanand Medical College and Hospital for one and half year from 1st March 2021 to 31st Aug 2022 including one month follow-up.

RESULTS: 41 patients were enrolled for present study. Mean age of patients was 53.44 years.19 patients (46.3%) were females and 22 (53.7%) were males. Tuberculosis was the chief etiologic factor present in 20 patients (48.8%). Various surgical modalities used were lobectomy, bullectomy, pneumonectomy, wedge resection and segmentectomy. 3 patients out of 41 were converted into open thoracotomy. Conversion rate in our study was 7.32%. Mean duration of VATS surgery (274.47±40.11 mins) was shorter than the patients that were converted into open procedure (353.33 ± 64.29 minutes). Patients who underwent VATS had lesser intraoperative, postoperative complications, lesser need of analgesics for lesser number of days, less hospital stay with early return to work than the patients who underwent open thoracotomy. Mean chest tube drainage duration in VATS group was (7.84±1.53 days) and in patients that converted in open thoracotomy was (17.00 ± 1.73 days). In our study, we have also seen duration of surgery, intraoperative complications , postoperative complications, chest tube day of removal, duration of hospital stay , time to return to work between patients who had tuberculosis with that who did not have tuberculosis.

Conclusions: VATS is a safe, practical, and effective therapeutic modality. In our experience, VATS is preferable to open thoracotomy in terms of lesser surgical time and blood loss, less postoperative discomfort and analgesic demand, shorter hospitalisation and chest tube drainage length, and faster return to regular activities.

Key words: (VATS) Video assisted pulmonary resections, tuberculosis open thoracotomy

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INTRODUCTION

Minimally invasive surgery has progressed dramatically after the successful introduction of laparoscopic cholecystectomy by Erich Muhe (as described by Reynolds).[1] Surgeons may now execute more difficult surgical operations because of advancements in perioperative care services, technology, and specialised tools utilised for these treatments. The fundamental idea behind these surgical methods is to reduce the amount of surgical trauma while maximising patient recovery without sacrificing the desired result. The use of video-assisted thoracoscopic surgery (VATS) for a variety of surgical procedures, including pleural biopsy, wedge resection, lobectomy, and lung biopsy, was quickly embraced by thoracic surgeons following Muhe's success.[2-4] However, from an oncologic standpoint, the use of VATS for anatomic lung resection was initially questionable, and the feasibility of VATS lobectomy was not proved until Swanson and colleagues [5,6] demonstrated that the technique could be conducted without the need for any rib spreading. Since then, a growing number of surgeons have learned how to do VATS lobectomy. But there is a steep learning curve, especially because the haptics are removed, making it harder for the surgeon to manually palpate the remaining lung tissue for any new lesions. Furthermore, the rising use of specialized thoracoscopic instruments has generated concerns about the significant overhead expenses associated with executing these procedures. It has been demonstrated that VATS may be more cost-effective overall than open surgery, even if the expenditures of the operating room and the equipment may be greater.[7] Although operating room costs are greater for VATS than for standard thoracotomy, these costs have been demonstrated to be offset by the much shorter hospital stay and consequent cost savings thereof.[8] However, it has been noted that the majority of published research on VATS have only looked at data from a few institutions, often from academic centres of excellence, which

restricts how much the findings can be applied to the whole VATS [9-11] Video-assisted thoracoscopic surgery is increasingly being used to diagnose and treat a variety of thoracic illnesses that formerly required sternotomy or open thoracotomy. The advantages of keyhole surgery include a smaller incision, a scar that looks better visually, reduced postoperative discomfort, and an earlier hospital discharge. The approach also offers the prospect of greater safety and lesser physiological insult to the body at the time of surgery.[12] The adoption of VATS in the thoracic community has been gradual, despite the abundance of documented improved short and long-term results in retrospective observational studies. Only a tiny portion of pulmonary resections are now carried out globally with VATS. There is a paucity of robust clinical data in the form of large randomized controlled trials to compare VATS to open thoracotomy, and publication bias in the vast majority of retrospective studies in the existing literature cannot be excluded.[13] VATS detractors contended that the non-randomized patient selection method in retrospective studies may result in a "false positive" finding of higher VATS results when more favourable patients are chosen for this unique technique. To investigate the current literature to see for potential patient selection bias for VATS, we analysed preoperative outcomes in unmatched patients to see if there were any significant variations between these two study groups. A number of retrospective studies have used propensity score matching as a statistical method to reduce patient selection bias between VATS and open thoracotomy treatment groups in recent years.[14-20] Flores and colleagues compared 313 propensity score-matched patients who underwent VATS lobectomy or open thoracotomy and found that VATS patients had a similar 5-year overall survival but significantly fewer postoperative complications and a shorter duration of hospitalisation than open thoracotomy patients.[18] Propensity score was used in two studies by Scott et al. to compare patients undergoing VATS vs open thoracotomy.[19,20] There is growing evidence to suggest that VATS is a

safe and practical procedure that produces better perioperative results than traditional open thoracotomies.[14,21] Based on the benefits reported in surgical outcomes after thoracoscopic resections and the delivery of adjuvant chemotherapy, VATS lobectomy may be superior than open thoracotomy in terms of oncologic efficacy.[22] This may strengthen the importance of VATS in the treatment of lung cancer and raise the bar for thoracic surgery's overall standard of outcome evaluation. Open decortication remained the definitive therapy of pleural empyema for many years. Both acute and chronic empyemas can be effectively treated with open decortication.[23,24] The comparison with the thoracoscopic method has generated a lot of discussion. Despite the minimally invasive advantages, initial doubts about the efficiency of VATS in properly decorticating the pleural cavity have hindered widespread acceptance. Open decortication, in contrast, has been found to allow for total lung expansion, which increases lung vital capacities and improves symptoms.[23,25] However, several recent studies have directly compared the two strategies and shown that VATS decortication results in decreased patient morbidity and death while providing equal rates of empyema remission.[26,27]

Video assisted thoracoscopic surgery is finding an ever increasing role in diagnosis and treatment of various thoracic disorders that previously required open thoracotomy. Despite this, its implementation in developing country like India become difficult due to high equipment cost, use of specialized thoracoscopic instruments, long eroperative room times and steeper learning for the surgeons and operating room personnel.

Therefore still, we do not have enough data from studies conducted in India that confirm the applicability and technique in our country taking into account the particular characteristics of the patient and centres that provide care to them.[28,29] The primary objective of our study is to study the clinical spectrum and outcome of VATS pulmonary resections including the intraoperative and postoperative complications, need for

analgesics, need for blood transfusion, chest tube drainage time, need for open thoracotomy and 30 days follow up.

This study was conducted in the Department of General Surgery, DMCH, Ludhiana, for a time period of 1 and half year with 1 month follow up from 1st March 2021 to 31stAug 2022 including one month follow up after taking approval from the ethical committee.

AIMS AND OBJECTIVE

1) To study the clinical spectrum and outcomes of VATS pulmonary resections including the intraoperative and postoperative complications, post operative pain, need for analgesics, need for blood transfusion, chest tube drainage time, hospital stay,need for open thoracotomy, time to return to work and 30 days follow up.

2) To study the aetiological profile of patients undergoing surgery.

REVIEW OF LITERATURE

Without a doubt, video-assisted thoracic surgery (VATS) has been the most significant innovation in thoracic surgery during the last half-century. No other single breakthrough has so completely transformed the way thoracic surgeons execute their craft, or so significantly enhanced the surgical experience for patients worldwide undergoing thoracic surgeries. VATS surgeons worldwide have generally attributed the origination of thoracoscopic therapy to the Swedish physician Hans Christian Jacobaeus (Jacobaeus, 1910 [30], Braimbridge, 2000 [31], Sihoe&Yim, 2008[32]). Toward the end of the nineteenth century, he utilised a modified cystoscope to inspect the pleural cavity under local anaesthetic. Jacobaeus looked inside the chest through the stiff tube using a simple candle as a light source. He primarily used this technique to lyse adhesions in order to collapse the lungs as this was the prevailing treatment for tuberculosis at that time. Day, Chapman, and O brain [33] described 1000 cases of successive closed intra pleuralpneumolysis in 1948. Only two deaths and 50 cases of tubercular empyema were reported. Tuberculosis was still active in 20% of patients after a 7-year follow-up, and 28% patients had died. However, 52% of tuberculosis patients were cured. Following the initial era of euphoria, an age of neglect began in 1945, and thoracoscopy was limited to diagnostic treatments solely. As interest in thoracescopywained, the only operational procedure performed thoracoscopically was biopsy. After nearly 25 years of abandonment, surgeons all across the world began substituting thoracotomy with VATS for various intrathoracic surgeries. Bloomberg summarised the history of thoracoscopy and its function in the care of thoracic disorders at a symposium in Marseille. DovWeissberg[34] published his experience with 127 pleuroscopies in 1980. Pleural effusion was the most common indication in his study (n=73). There were two minor complications but there was no mortality. He concluded

pleuroscopy, is a helpful diagnostic and therapeutic treatment with a high diagnostic yield of more than 90%.VATS gradually became the preferred technique for thoracic procedures such as the identification of single lung nodules, diffuse pulmonary infiltrates, and pleural illness, as well as simpler treatment procedures such as mediastinal lesion excisions. It was inevitable that more difficult pulmonary surgeries would be carried out with VATS as experience grew.

Tuffiers performed the first lung excision in 1891 using a posterolateral thoracotomy. VATS lobectomy has essentially replaced open thoracotomy in recent years. Dr. Ralph Lewis was among the first to report a significant series of lobectomies for lung cancer utilising the VATS method (Lewis et al, 1992[35]; Lewis, 1995[36]). Lewis claimed an amazing 79.5-minute average operating time and a hospital stay of 3.07 days (Lewis & Caccavale, 2000 [37]). Early research has shown that patients who have resection using the VATS method suffer from less acute discomfort than those who have the thoracotomy approach. This has been shown in numerous large case-control studies, either by objective evaluation of analgesic needs (Yim et al., 1996 [38]; Walker et al., 1996 [39]), or through subjective evaluation of pain score, typically using a visual analogue scale (Giudicelli et al, 1994 [40]; Demmy& Curtis, 1999 [41]). According to Passlick et al (1998) study [42], individuals who had a thoracotomy required much more analgesics than those who had a VATS procedure. Earlier research studies on the assessment of postoperative pain was based on a subjective evaluation utilising a visual analogue scale (VAS) or numerous rating scale (NRS). In 2015, Norifumi et al. [43] compared the quantitative post-operative pain in patients having lobectomy via VATS or thoracotomy using an electrical neuro stimulator and came to the conclusion that the surgical approach was an independent risk factor for post-operative pain and in the early post-operative period, pain was significantly lower in patients having VATS as opposed to conventional thoracotomy. Early trials contrasting VATS with thoracotomy for lobectomy revealed a trend

for less post-operative analgesic need (Sugiura et al, 1999 [44]). Reduced pain caused faster healing, which resulted in much shorter hospital stays and an earlier return to pre-operative job or activities (Demmy& Curtis, 1999 [41]; Sugiura et al, 1999 [44]). However, a preliminary, limited, multi-institutional, randomised, prospective trial comparing lobectomy performed with VATS to thoracotomy found no appreciable pain-reduction benefits for VATS (Kirby et al, 1995 [45]). In 1933, the first successful lung cancer pneumonectomy was carried out. [46]. However, there was some doubt about the sufficiency of clearance for oncological lung resections with curative purpose. In one study, an open thoracotomy performed on the same patient immediately following VATS ,nodal dissection could only produce 3% more nodal tissue, which is a negligible quantity (Sagawa et al, 2002[47]). Two retrospective studies on non-contemporary cohorts of VATS and thoracotomy patients discovered that VATS produced comparable or significantly less nodal tissue, but that survival and staging were unaffected (Watanabe et al,2005 [48]; Denlinger et al, 2010 [49]). A more recent prospective investigation of contemporary VATS and thoracotomy cohorts found that VATS yielded at least as much nodal tissue as thoracotomy regardless of side, lobe, or stage of lung cancer(Sihoe et al, 2011[50]). The 2-year recurrence-free survival was also higher with VATS, and it also gave higher yields at usually "trickier" nodal stations such the subcarinal nodes perhaps because VATS provided a superior view in such locations. According to Yan et al 's[51] study from 2009, VATS lobectomy had a considerably greater 5-year disease-free survival rate than open thoracotomy lobectomy. In a recent retrospective cohort research with 84 patients, survival and recurrence rates were compared between patients having VATS resection and those having an open resection and it was found that the VATS group had a shorter hospital stay and patients had a higher 5-year survival rate. It was also indicated that VATS lobectomy was the principal driver of this survival advantage (Lau et al, 2010 [52]). However, Flores et colleagues

[18]observed a comparable 5-year overall survival but considerably fewer postoperative complications and a shorter hospital stay in a propensity score matched analysis that compared VATS lobectomy with open lobectomy. There is growing evidence that, VATS induces reduced depression of pulmonary function following lung resection surgery compared to thoracotomy. Kaseda reported that the forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) values measured three months after surgery were significantly preserved relative to pre-operative values in patients who underwent lobectomy via VATS versus those who underwent lobectomy via thoracotomy (p0.0001. (Kaseda et al, 2002[53]). In a related study, patients who underwent VATS lung resection rather than thoracotomy had better postoperative PaO2, SaO2, peak flow rates, FEV1 and FVC on postoperative days 7 and 14. (Nakata et al,2000[54]). The recovery of vital capacity and cardio-pulmonary function following surgery, as well as blood oxygenation, lung diffusion capabilities, 6-minute walk test results, all tend to be better after VATS than after other types of open thoracotomy for pulmonary resections (Nagahiro et al, 2001[55]; Nomori et al, 2002[56] & 2003[56]). Endoh et al. determined in 2009[57] that VATS lobectomy was superior to open thoracotomy in terms of respiratory function. Kachare et al. [58] conducted a retrospective cohort analysis on 70 patients receiving lobectomy through VATS or open thoracotomy and discovered that the VATS group had a lower incidence of postoperative pneumonia and a shorter hospital stay. They also came to the conclusion that patients with poor lung function tolerated the thoracoscopic surgery better.

When compared to the VATS group, intraoperative and postoperative blood loss was shown to be greater for open thoracotomy group (Krasna et al,1996).[59] This could be attributed to less invasiveness of the operation as well as greater hemostasis due to better lung field magnification and vision during VATS.

However, Freixinet et al [60] reported that the blood loss in the two groups was about equal. Handy et al [61] observed decreased intraoperative blood loss and requirement for blood transfusion in the VATS group in a retrospective examination of prospective observational data involving 241 patients who had lobectomy either via VATS (n=49) or median sternotomy (n=192). Additionally, it was claimed that patients in the VATS group required much less postoperative analgesics than those in the standard open group and spent less time in the hospital overall. They also concluded the patients in the VATS group also had better functional results and lower hospital readmission rates. A propensity matched analysis of a large study with 284 patients in each group undergoing VATS lobectomy and lobectomy by open thoracotomy found that VATS lobectomy was associated with a lower incidence of complications such as atrial fibrillation, pulmonary atelectasis, prolonged air leak, pneumonia, and the need for blood transfusions. Furthermore, the VATS group had a much shorter hospital stay and chest tube drainage (Villamizar et al, 2009)[11] Whitson et al. [62] discovered that VATS considerably reduced the frequency of postoperative problems compared to open surgery.The patients with poor pulmonary function undergoing lobectomy by open thoracotomy had a considerably higher rate of pulmonary problems than those with poor pulmonary function undergoing VATS.In a more recent large retrospective cohort study of 12970 patients, Ceppa et al [63] compared lung resection by VATS with open thoracotomy and concluded that patients with poor pulmonary function undergoing lobectomy by open thoracotomy had a significantly higher rate of pulmonary complications than those undergoing VATS. Due to decreased intraoperative and postoperative complications and morbidity and minimal invasiveness of the procedure, duration of hospitalization is expected to be shorter in the patients undergoing VATS.

This is in line with the writings of other scholars, including Massard et al [64] and Bertrand et al [65]. A. Angelillo et al [66] reported 64 cases of

empyema operated thoracoscopically or by thoracotomy in 1996. They discovered that patients underwent VATS had shorter hospital stay and chest tube indwelling times. He also discovered that the rate of VATS conversion to open operation was about 10%, and that VATS provided similar disease resolution as thoracotomy but was considerably superior in terms of cost, cosmetic outcome, and surgical sequelae. Yen et al [67] evaluated the role of VATS in lobectomy for pulmonary tuberculosis and discovered that patients who underwent VATS had a lower complication rate, a shorter hospital stay, and much less blood loss.According to a study done in 2014 on patients with pulmonary aspergilloma by Chen and his colleagues [68],there was no difference in the median operating time or blood loss between the VATS and thoracotomy groups, but the VATS patients experienced fewer postoperative complications and spent less time in the hospital. In his study, the VATS to open thoracotomy conversion rate was close to 12%.Recent research has shown that postoperative problems, the length of chest tube drainage, and hospital stay have significantly decreased in chest trauma patients (Wu et al, 2015 [69]).

MATERIALS AND METHODS

This study was conducted in department of Surgery, Dayanand Medical College and Hospital for one and half year. All the patients were informed about the procedure of VATS in detail and surgery was performed after taking written and informed consent from each patient. Relevant present and past history was recorded. Intraoperative and postoperative data was collected for all patients and data was recorded in proforma for analysis and interpretation of data.

SOURCE OF DATA

Patient attended outpatient and inpatient in department of surgery, Dayanand Medical College and Hospital constituted the source of data.

METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

1) Patients who were fit for VATS pulmonary resections done for various benign and malignant pathologies.

2) Various procedures included were as follows:

- Pneumonectomy
- Lobectomy
- Segmentectomy
- Wedge resections

EXCLUSION CRITERIA

The following group of patients were excluded from the study:

- Haemodynamically unstable patients
- Bleeding disorders
- Advanced carcinoma of lung
- Cardiovascular insufficiency

DURATION OF STUDY: The study was conducted for one and half year from 1st March 2021 to 31st Aug 2022 including one month follow-up.

Consent: All patients were informed about both the procedures (VATS/ open thoracotomy). An informed consent was taken after a discussion with the patient and his/her close relatives about the pros and cons of opting for both procedures. This discussion necessarily included information about the natural history of the diseases in absence of surgical intervention, risk of anaesthesia and surgery, possible complications of surgery like haemorrhage and respiratory failure, need for icu stay, requirement of blood transfusion and its possible hazards, post op air leak and expected results and benefits of surgery .Relevant present and past history was recorded. Findings of general physical examination and specific systemic examination were recorded in details along with the following Investigations-:

1. Blood counts
- Haemoglobin
- Total Leukocyte count
- Differential leukocyte count

2. Renal function test

3.Coagulation profile
- Prothrombin time

4. Chest X-ray

5.Pulmonary function test (if indicated)

6.ABG (if indicated)

7. CT Scan chest (if indicated)

Basic operative set up for VATS:

1. General Anaesthesia.
2. Double lumen endotracheal tube.

3. Open thoracotomy instrument tray.
4. Thoracoscope-10 mm operative scope.
5. High resolution video monitor – preferably positioned on opposite side of operating table for surgeon and assisting team.
6. 2 to 5 ports of intercostal operative access.
7. Videoscopic instruments and selected surgical instruments.
8. Endoscopic stapling and clip appliers.
9. Adequate suction and smoke evacuation system.

Procedure of VATS lobectomy:

Position of the patient (Ports position):

1) Utility incision was given at the level of the fourth intercostal space, usually in front of the anterior edge of the latissimus dorsi along an imaginary line between the tip of the scapula and the nipple.
2) The second port, which was two intercostal spaces below the utility incision, in the anterior axillary line was used for camera.
3) The third port was normally placed along the same line as of the camera port along the posterior axillary line.

PROCEDURES:

Right Upper Lobe Lobectomy:

1) Pulmonary ligament

A) Through the utility incision, the right lower lobe was retracted superiorly.
B) The thoracoscope was aimed anteriorly with the 30° lens pointed posteriorly.
C) We proceeded with the incision of the pulmonary ligament and lymph nodes for histology (Stations 8 and 9) were collected.

2) Right upper lobe vein

The lung was retracted by means of a long sponge stick inserted through the posterior port, so as to facilitate the exposure of the superior pulmonary vein. Once the inferior border of the vein was dissected, we

created a separation between the upper and middle lobe branches until the underlying pulmonary artery was visualized. Once a plane was created, a silicone vessel loop was used to retract the vessel and insert a stapler through the posterior port.

3) Anterior trunk

A) Division of the upper lobe vein allows exposure of the interlobar pulmonary artery with its first branch

B) The anterior and posterior trunk was dissected and encircled with a silicone vessel loop.

4) Right upper lobe bronchus

A) The upper lobe was retracted posteriorly

B) The right upper lobe bronchus was dissected and encircled with a silicone vessel loop and transected with a stapler introduced through the posterior incision.

5) Fissure

A) Once the right upper lobe bronchus was divided, it was usually easy to complete the fissure from front to back.

B) The first stapler inserted through the utility port and was directed towards the hilum while taking care to remain above the middle lobe vein.

C) The second stapler was more horizontal and was positioned above the interlobar pulmonary artery. The lobe was then extracted through a specimen retrieval bag.

VATS Pneumonectomy procedure:

A. Using the electro coagulation hook and suction tip, mediastinal pleura was opened and the left superior and inferior pulmonary veins were exposed.
B. Left pulmonary artery was dissected.
C. Pulmonary vein and artery was transected using the endo-stapler introduced through the assistant's port.

D. The left bronchus was fully exposed and transected using the endo-stapler introduced through the assistant's port.

VATS segmentectomy:

When performing a lingulectomy dissection was started from the vein. Once the vein was parted, the upper lobe bronchus was dissected distally to identify and divide the segmental branch to the lingula. The lingular artery was then isolated and parted. The fissure was completed, and transection of the parenchyma was finally performed.

VATS WEDGE RESECTION:

After localization of lesion, several techniques were used to resect the lung. Small lesions may be excised with single staple run, while larger lesions require 3-dimensional planning with numerous staple runs. The deflated lung tissue was rotated from apex or base to lie over hilum to allow straight staple cuts.

Surgical technique of open thoracotomy

The patients after having received general anaesthesia in contralateral decubitus position, underwent open thoracotomy via a posterolateral thoracotomy incision. Here serratus anterior muscle was spared and rib spreader was used to gain access to the thoracic cavity. The pleural cavity was then entered through 5^{th} intercostal space routinely. A finochietto retractor was used to facilitate the exposure. If adhesions were present between the lung and the pleural wall then adequate adhesiolysis was done. The required surgical procedure was then carried out and use of staplers made as and when required. Complete hemostasis was achieved. Thoracic cavity was then washed with warm saline and one or two chest tubes were placed at appropriate locations to facilitate proper drainage. Both sides of the ribs were sutured together to decrease the intercostal space. Chest wall was closed in layers and skin sutures/stapler applied followed by an aseptic dressing.

Intraoperative and postoperative data was collected for all the patients.

Intraoperatively, Time taken for surgery was calculated from the start of incision to the last suture. The operative findings along with the problems faced during the surgery were noted. Complications were noted like excessive bleeding and any need of blood transfusion. If the procedure was converted from VATS to open procedure, then the reasons for doing so were also recorded.

Postoperatively, assessment was made regarding postoperative pain by visual analogue scale at 0 POD, 3rdPOD, 7thPOD and 1 month period. The type, quantity and duration of analgesic required was also noted. Any complications namely prolonged air leak (duration of more than 5 days), excessive bleeding, any need of blood transfusion, were noted. Biopsy reports were followed. Post operative duration of chest tube drainage, duration of hospital stay and time to return to routine daily work was also noted. It was also noted if any patient required further surgical intervention. Assessment of outcome was made with respect to whether patient was discharged, discharged on request or was discharged against medical advise. Serial chest x-rays were done over 1 months of follow up period to look for any disease recurrence, relapse or any long term complication.

Data were described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. To determine whether the data were normally distributed, a Kolmogorov-Smirnov test was used. Comparison of quantitative variables between the study groups was done Mann Whitney *U* test for independent samples for non-parametric data. For comparing categorical data, Chi square ($\chi 2$) test was performed and fisher exact test was used when the expected frequency is less than 5. A probability value (*p* value) less than 0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

SAMPLE SIZE ASSESSMENT

Sample Size Calculation

The incidence rate of vats surgery is 12.3% [70]

Assumptions:

Confidence Level = 95%

Precision (d) = ± 10%

For estimation of sample size, the following formula has been used

$n = (Z2\alpha \times P \times (1-P))/d2$

Where;

$Z\alpha$ = Value of standard normal variate corresponding to α level of significance

P = Likely value of parameter

Q = 1 – P

d = Margin of errors which is a measure of precision

With these assumptions the sample size works out as 41.

OBSERVATION AND RESULT

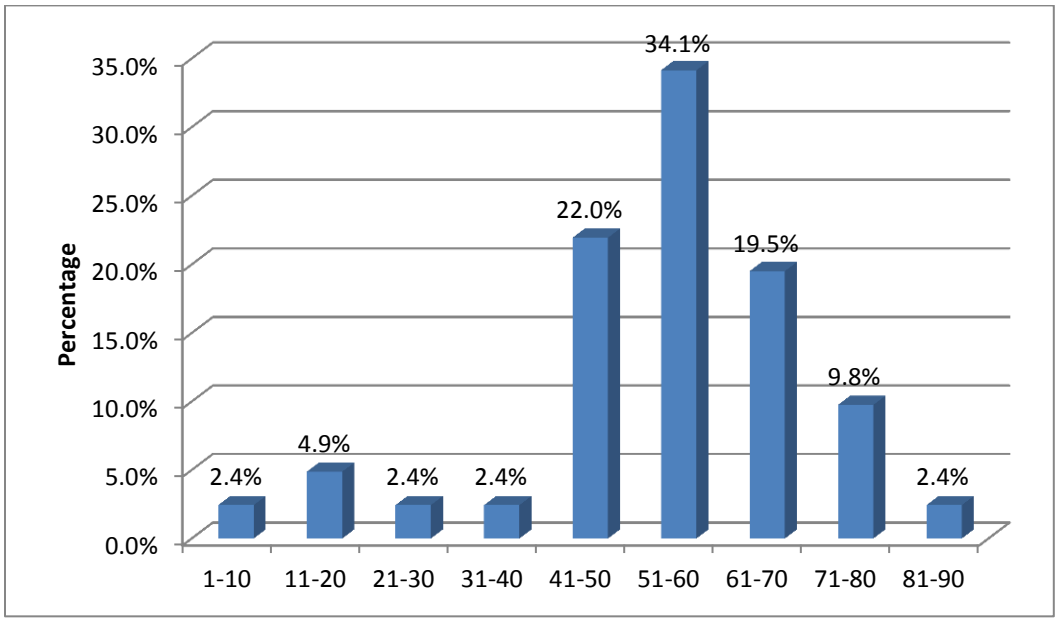
1. Age group and sex:

1 out of 41 patients (2.4%) were aged less than 10. 2 patients (4.9%) were in age group of (11-30)years. 1 patient (2.4) in age group (21-30)years. 1(2.4%) in (31-40)years . 9 patients (22%) in age group of (41-50) years. 14 patients (34.1 %) in age group of (51-60) years . 8 patients (19.5%) were in (61-70) years age group.4 patients (9.8%) were in (71-80) years. 1 patient(2.4%) in (81-90) years age group.

TABLE 1- Age wise distribution of patients

Age Group	No. of cases	Percentage
1-10	1	2.4%
11-20	2	4.9%
21-30	1	2.4%
31-40	1	2.4%
41-50	9	22.0%
51-60	14	34.1%
61-70	8	19.5%
71-80	4	9.8%
81-90	1	2.4%
Total	41	100.0%

FIGURE 1- Age wise distribution of patients



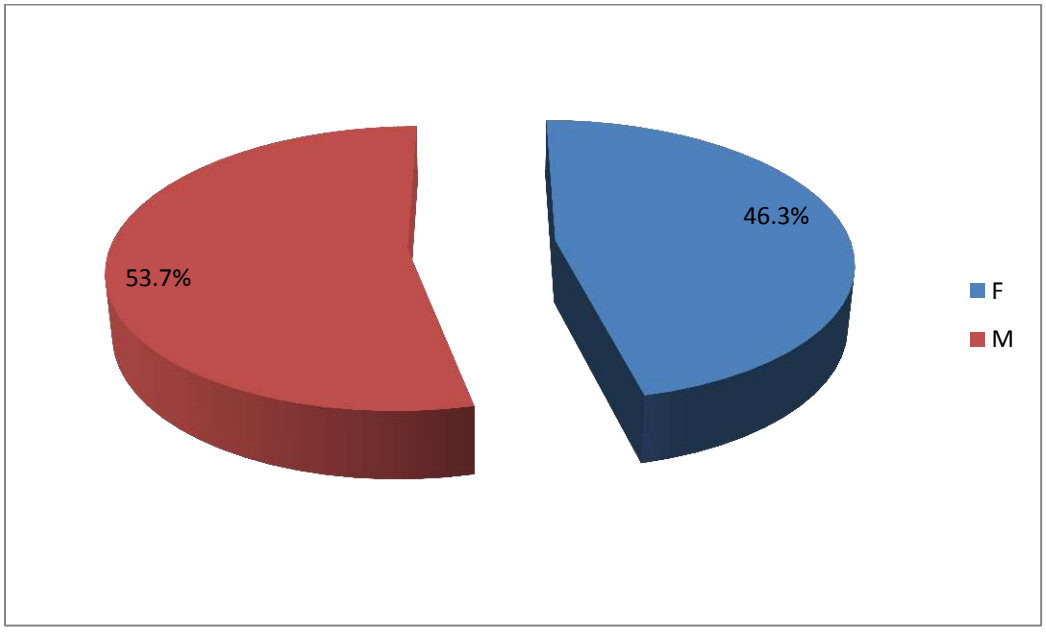
2. Sex:

Out of 41 patients 19 patients (46.3%) were females and 22 (53.7%) were males.

TABLE 2- Gender wise distribution of patients

Sex	No. of cases	Percentage
F	19	46.3%
M	22	53.7%
Total	41	100.0%

FIGURE 2- Gender wise distribution of patients



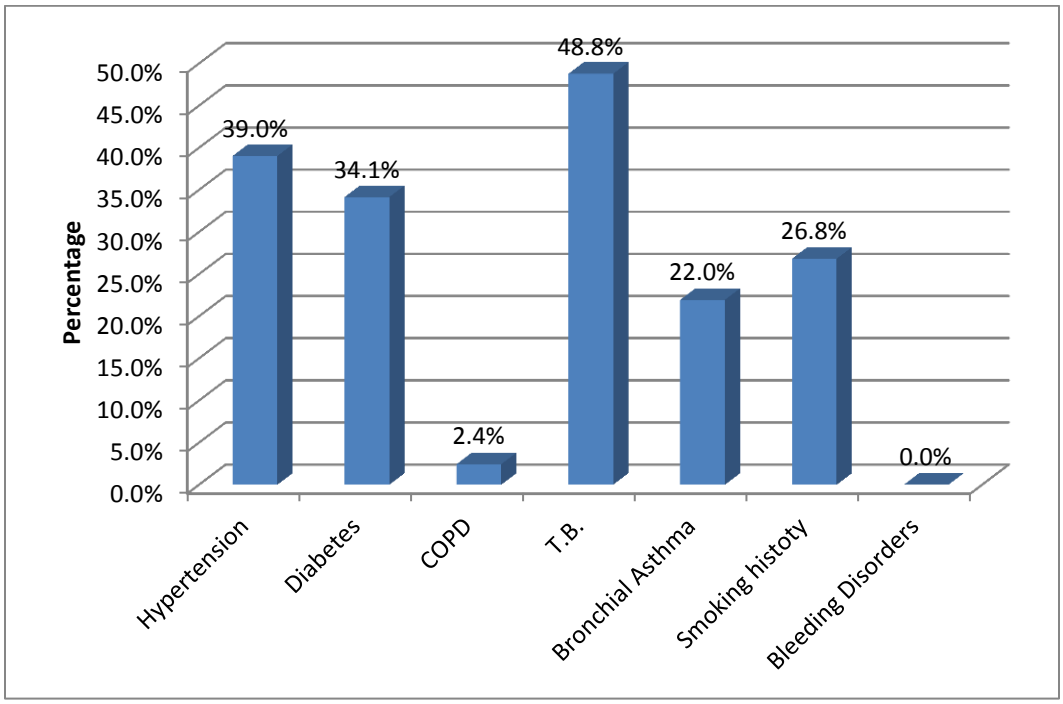
3. Associated comorbidities:

The commonest comorbidity was hypertension in 16 patients (39%) followed by diabetes in 14 patients (34.1%), bronchial asthma in 9 patients (22%) and COPD in 1 patient (2.4%).History of tuberculosis present in 20 patients (48.8%). History of smoking present in 11 patients (26.8%).

TABLE 3- Distribution of patients on the basis of comorbidities

Comorbidities	No. of cases	Percentage
Hypertension	16	39.0%
Diabetes	14	34.1%
COPD	1	2.4%
T.B.	20	48.8%
Bronchial Asthma	9	22.0%
Smoking history	11	26.8%
Bleeding Disorders	0	0.0%

FIGURE 3 - Distribution of patients on the basis of comorbidities



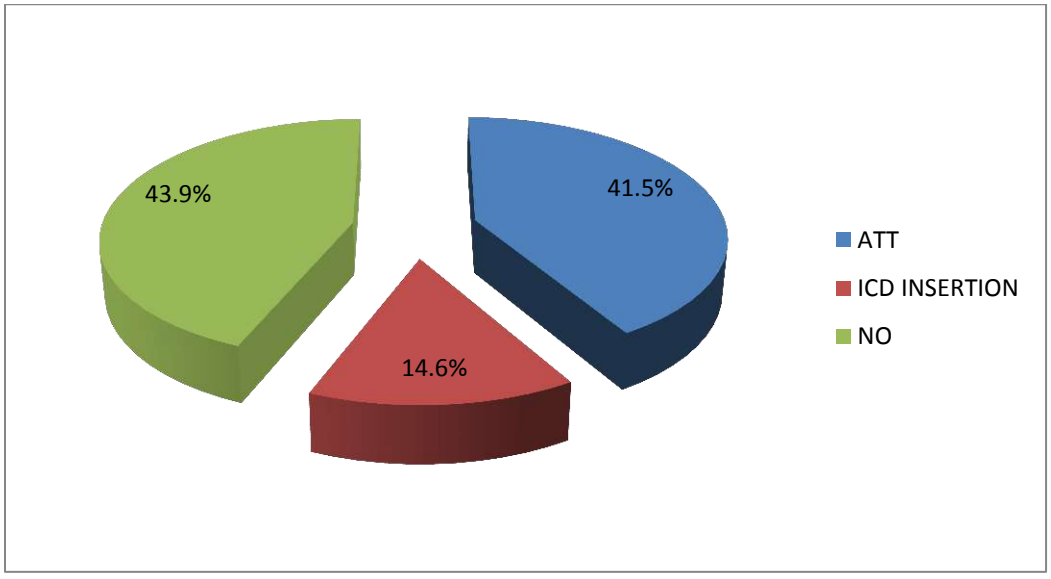
4) Any previous treatment and surgery:

Out of 41 patients 17 patients (41%) were on ATT and 6 patients (14.6%)had history of ICD insertion. 18 patients (43.9%) had not taken any treatment. No patient (100%) had any history of previous surgery.

TABLE 4- Distribution of patients on the basis of any previous treatment and surgery

Any previous treatment	No. of cases	Percentage
ATT	17	41.5%
ICD Insertion	6	14.6%
No	18	43.9%
Total	41	100.0%

FIGURE4- Distribution of patients on the basis of any previous treatment and surgery



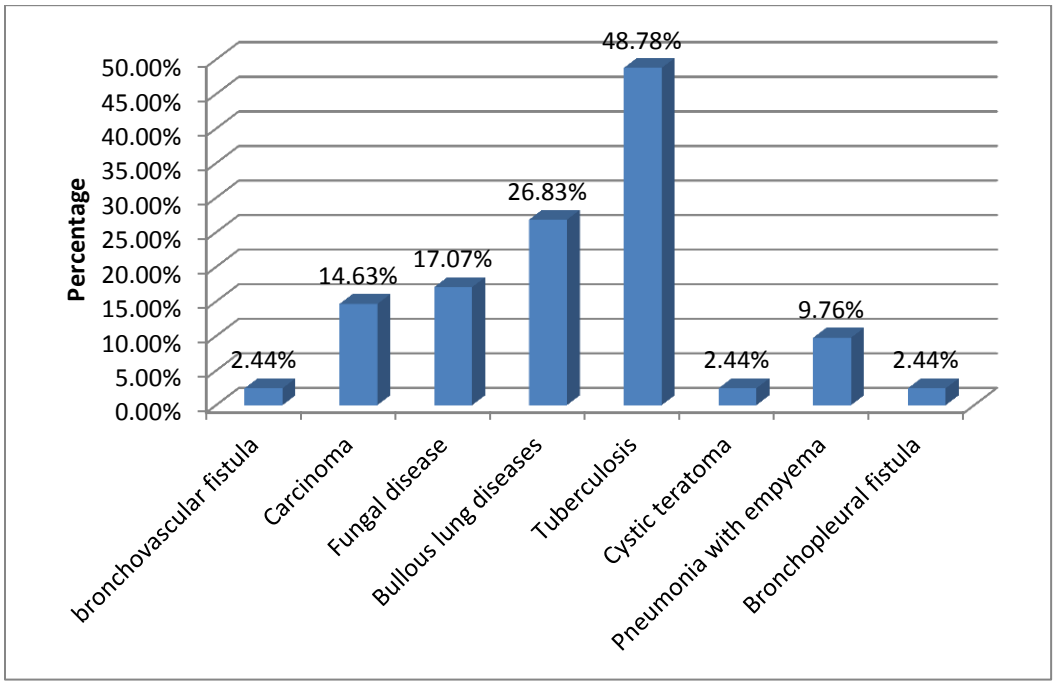
5) Etiology:

The commonest indication for surgery wastubercular lung (48.78%) followed by spontaneous pneumothorax (26.8%), fungal diseases (17.1%), carcinoma lung (14.6%),pneumonia with empyema (9.8%),cystic teratoma, bronchopleural fistula and bronchovasuclar fistula in 2..4% of patients each.

TABLE 5- Distribution of patients on the basis of Etiology

Etiology	No. of cases	Percentage
Bronchovascular fistula	1	2.44%
Carcinoma	6	14.63%
Fungal disease	7	17.07%
Bullous lung diseases	11	26.83%
Tuberculosis	20	48.78%
Cystic teratoma	1	2.44%
Pneumonia with empyema	4	9.76%
Bronchopleural fistula	1	2.44%

FIGURE 5 - Distribution of patients on the basis of Etiology



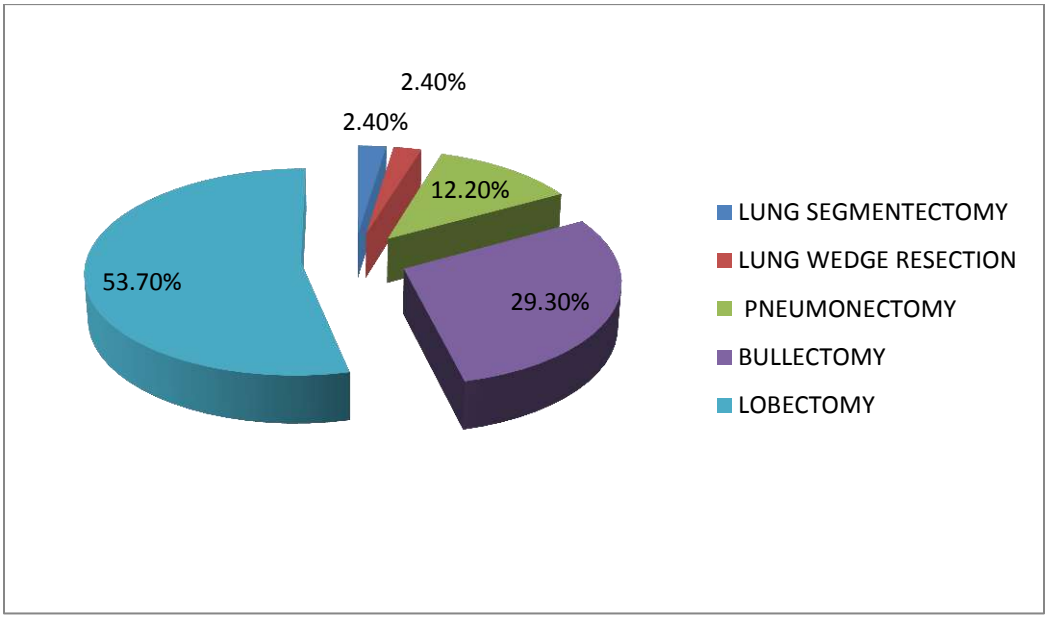
6) Surgical modality:

22 patients (53.7%) patients underwent VATS lobectomy.12 patients (29.7%) underwent VATS bullectomy. 5 patients (12.20%) underwent VATS pneumonectomy.1 patient (2.4%) underwent wedge resection and VATS underwent segmentectomy each. 3 patients out of 41 were converted into open thoracotomy.

TABLE 6-Distribution of patients according to surgical modality

Surgical Modality	No. of cases	Percentage
Lung segmentectomy	1	2.40%
Lung wedge resection	1	2.40%
Pneumonectomy	5	12.20%
Bullectomy	12	29.30%
Lobectomy	22	53.70%
Total	41	100.00%

FIGURE 6- Distribution of patients according to surgical modality

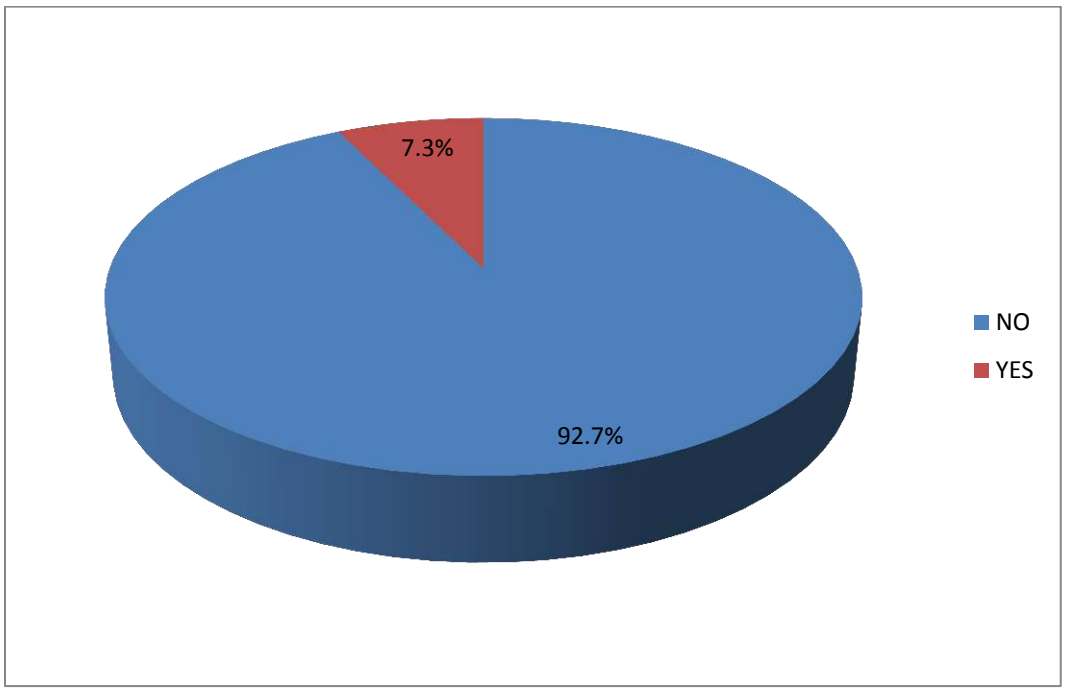


7) Conversion of VATS to open thoracotomy:3 patients out of 41 were converted into open thoracotomy. Conversion rate in our study was 7.3%.

TABLE 7-Conversion of VATS to open thoracotomy

Conversion of VATS to open thoracotomy (Yes/No)	No. of cases	Percentage
No	38	92.7%
Yes	3	7.3%
Total	41	100.0%

FIGURE 7-Conversion of VATS to open thoracotomy



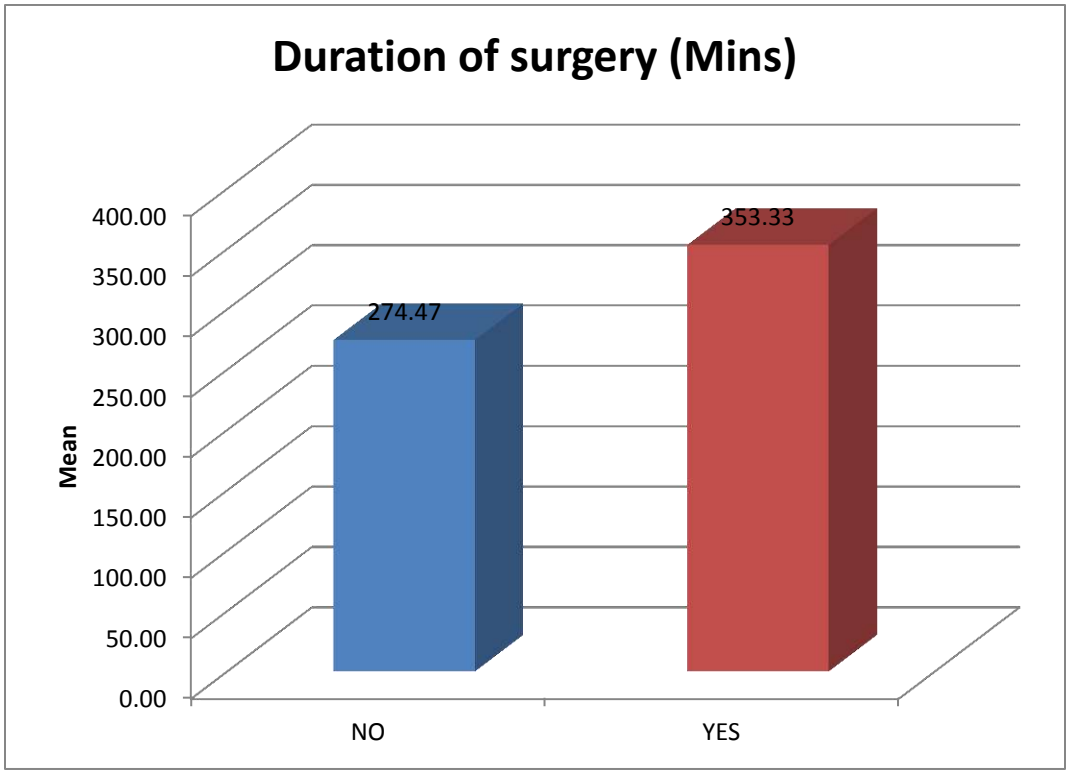
8) Duration of surgery:

Mean duration of VATS surgery was 274.47±40.11minutes and that converted to open thoracotomy was 353.33 ± 64.29 minutes.

TABLE 8- Distribution of patients on the basis of duration of surgery

Conversion of VATS to open thoracotomy	NO		YES	
	Mean	SD	Mean	SD
Duration of surgery (Mins)	274.47	40.11	353.33	64.29

FIGURE 8- Distribution of patients on the basis of duration of surgery



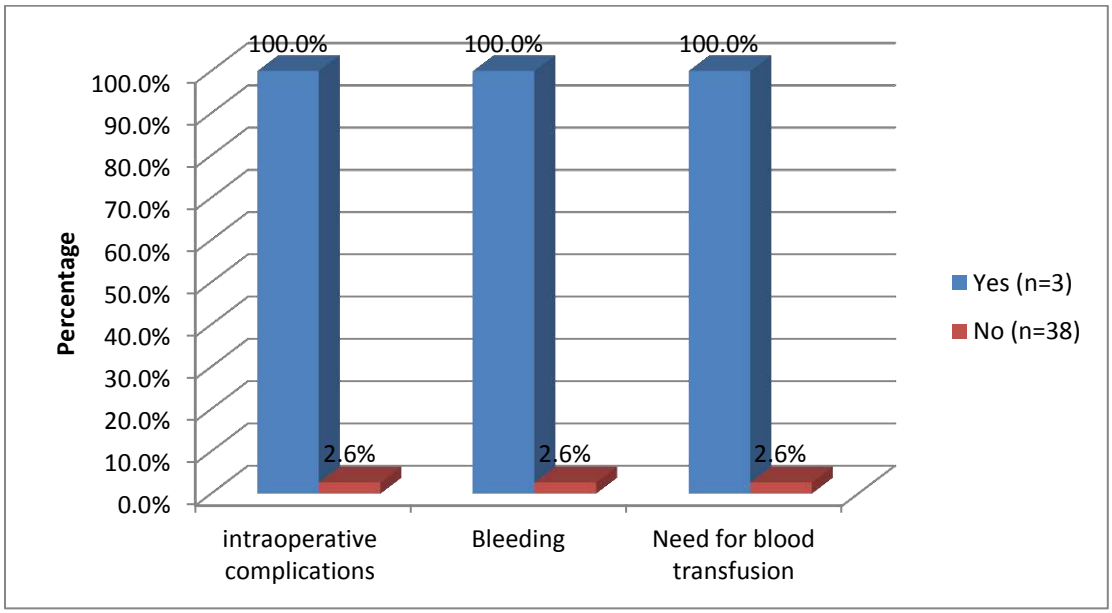
9) Distribution of patients according to intraoperative complications:

Out of 41 patients 37 patients (90.2%) had no complications and 4 patients (9.8%) patients had intraoperative bleeding and need blood transfusion. Out of these 4 patients, 2 patients converted to open thoracotomy due to bleeding and 1 patient converted to open thoracotomy due to adhesions and bleeding.

TABLE 9-Distribution of patients according to intraoperative complications

	Conversion of VATS to open thoracotomy (Yes/No)				Total
	Yes (n=3)		No (n=38)		
Intraoperative complications	3	100.0%	1	2.6%	4
Bleeding	3	100.0%	1	2.6%	4
Need for blood transfusion	3	100.0%	1	2.6%	4

FIGURE 9-Distribution of patients according to intraoperative complications



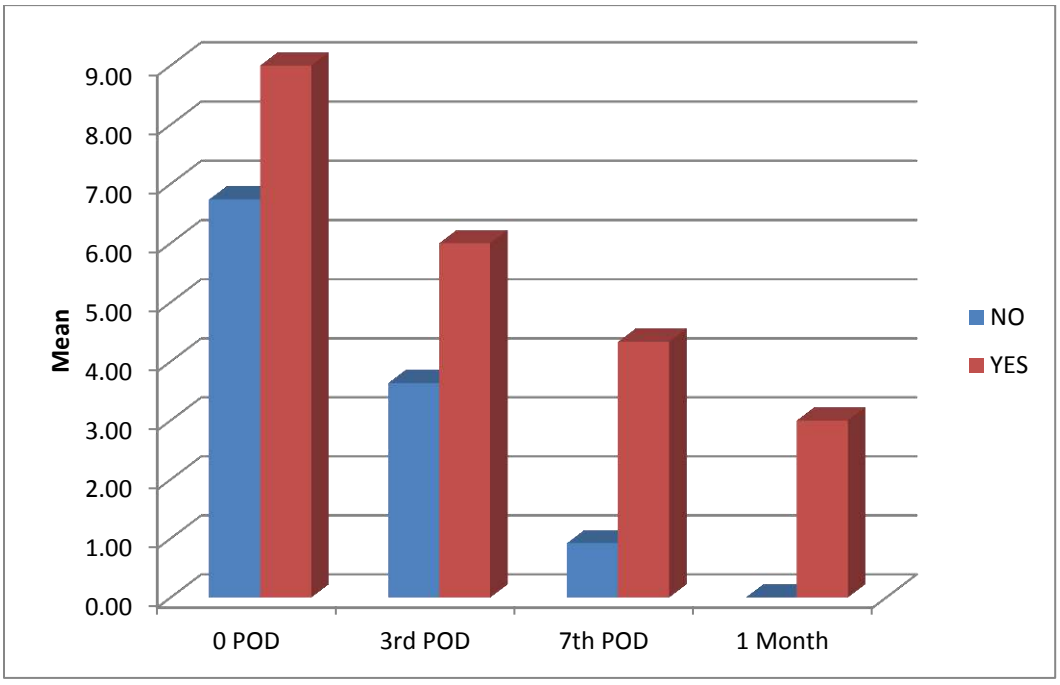
10) Post Operative pain:

There was significant difference in post operative pain as assessed by visual analogue scale till 1 month of postoperative period.

TABLE 10- Post operative pain of patients underwent VATS and the patients converting into open thoracotomy

Conversion of VATS to open thoracotomy	NO		YES	
	Mean	SD	Mean	SD
0 POD	6.74	0.76	9.00	0.00
3rd POD	3.63	0.79	6.00	1.00
7th POD	0.92	0.82	4.33	0.58
1 Month	0.00	0.00	3.00	1.00

FIGURE 10- Post operative pain of patients underwent VATS and the patients converting into open thoracotomy



11) Post operative analgesic requirement:

Two types of analgesics were used for adequate post operative pain control – NSAIDS and Opioids.

The required mean total dose of NSAIDS in post operative period (789.47±146.66 mg) which was lesser than that of patients that were converted to open thoracotomy procedure (1300±458.26 mg)

The mean total no of days for which NSAIDS had given was nearly half in VATS patients (2.61±0.55 days) as compared to the patients which were converted into open procedure (4.33±1.53 days).

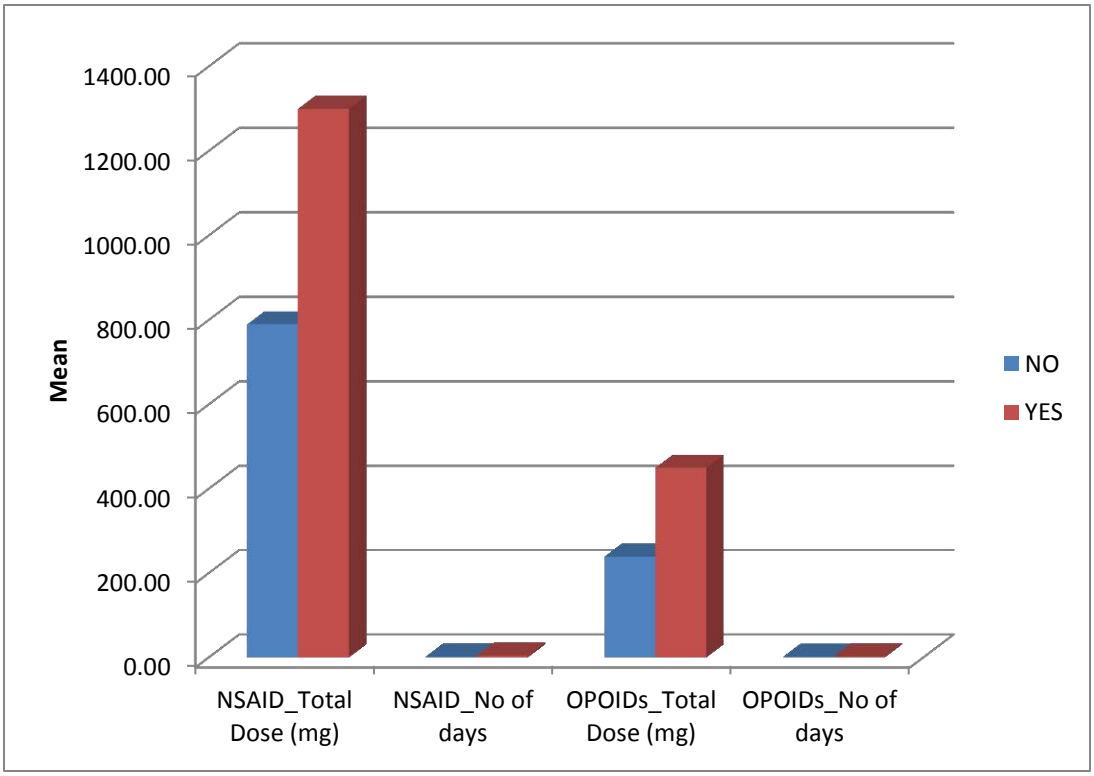
The mean total dose of post operative requirement of Opioids was (239.47±127 mg) which was lesser than that of patients that was converted to open procedure (450±0 mg)

The mean total no of days for which opioids was given to VATS group were (1.66±0.81 days) which were lesser than the patients that were converted into open procedure(3±0.0 days)

TABLE 11- Post operative analgesic requirement of patients underwent VATS and the patients converted into open thoracotomy

Conversion of VATS to open thoracotomy	NO		YES	
	Mean	SD	Mean	SD
NSAID_Total Dose (mg)	789.47	146.66	1300.00	458.26
NSAID_No of days	2.61	0.55	4.33	1.53
OPOIDs_Total Dose (mg)	239.47	127.96	450.00	0.00
OPOIDs_No of days	1.66	0.81	3.00	0.00

FIGURE 11- Post operative analgesic requirement of patients underwent VATS and the patients converted into open thoracotomy



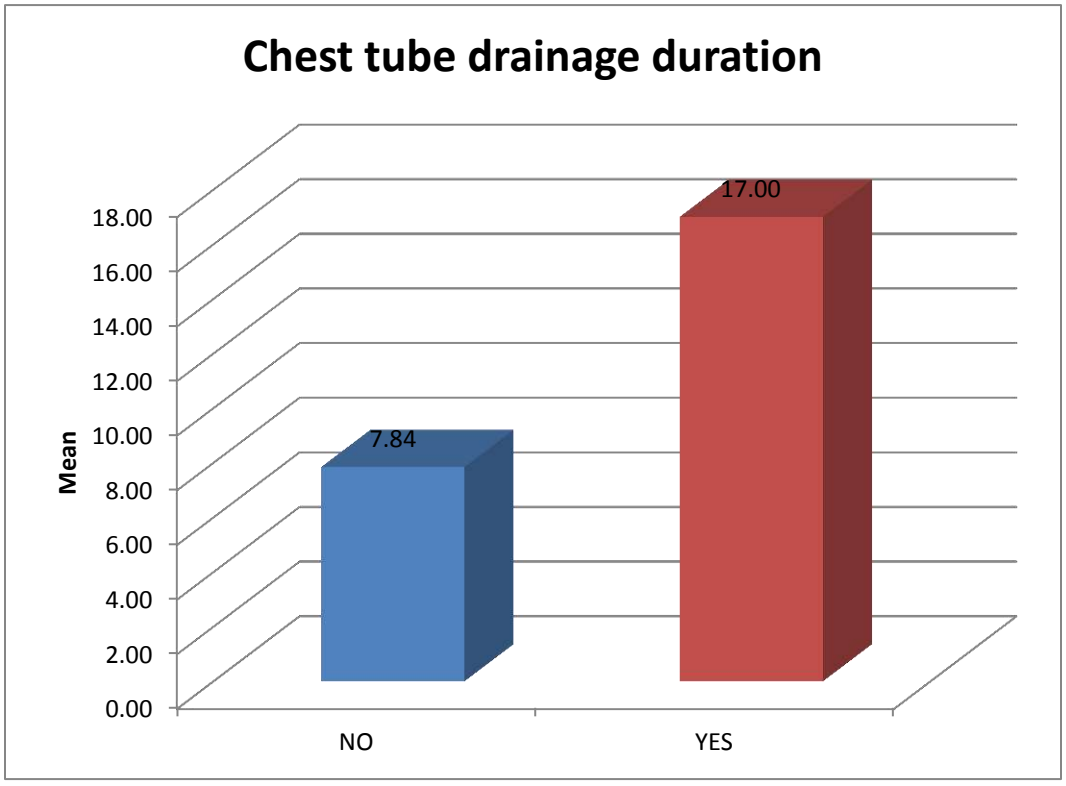
12) Chest tube drainage duration:

Mean chest tube drainage duration in VATS patients was (7.84±1.53 days) and that converted in open thoracotomy was (17.00±1.73 days).

TABLE 12- Chest tube drainage duration of patients underwent VATS and the patients converted into open thoracotomy

Conversion of VATS to open thoracotomy	NO		YES	
	Mean	SD	Mean	SD
Chest Tube Drainage duration	7.84	1.53	17.00	1.73

FIGURE 12- Chest tube drainage duration of patients underwent VATS and the patients converted into open thoracotomy



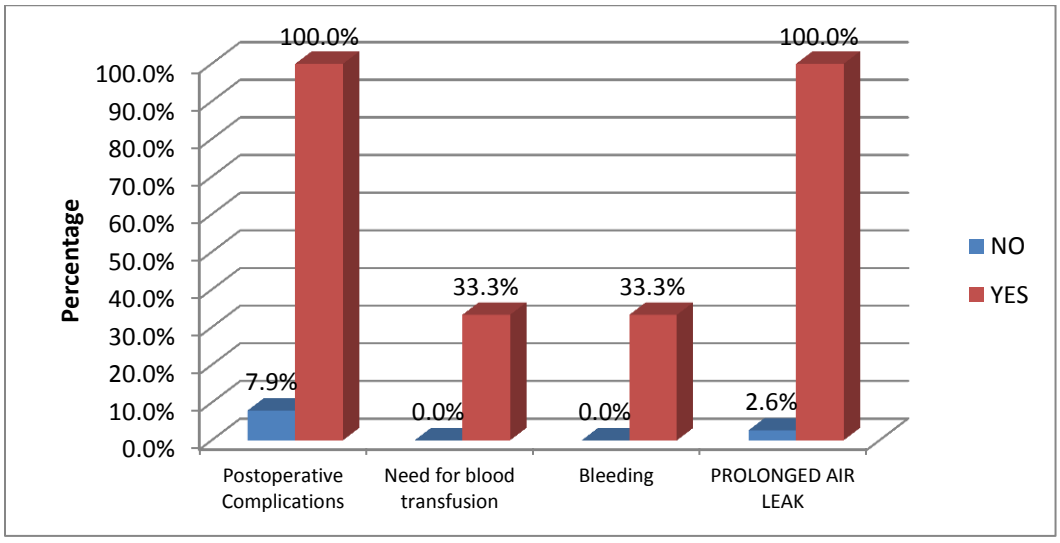
13)Post operative complications:

About 4 patients (9.7%) had postoperative complications. 4 patients had prolonged air leak and 1 patient out of 4 also had post operative bleeding and need for blood transfusion. About 4 patients had post operative complications of which frequency was least in VATS n=1 (2.4%)

TABLE 13- Distribution of patients according to post operative complications

		Conversion of vats to open thoracotomy (Yes/No)				Total
		NO	NO	YES	YES	
Postoperative Complications	YES	3	7.9%	3	100.0%	6
Need for blood transfusion	YES	0	0.0%	1	33.3%	1
Bleeding	YES	0	0.0%	1	33.3%	1
Prolonged Air Leak	YES	1	2.6%	3	100.0%	4
Total		38	100.0%	3	100.0%	41

FIGURE 13- Distribution of patients according to post operative complications



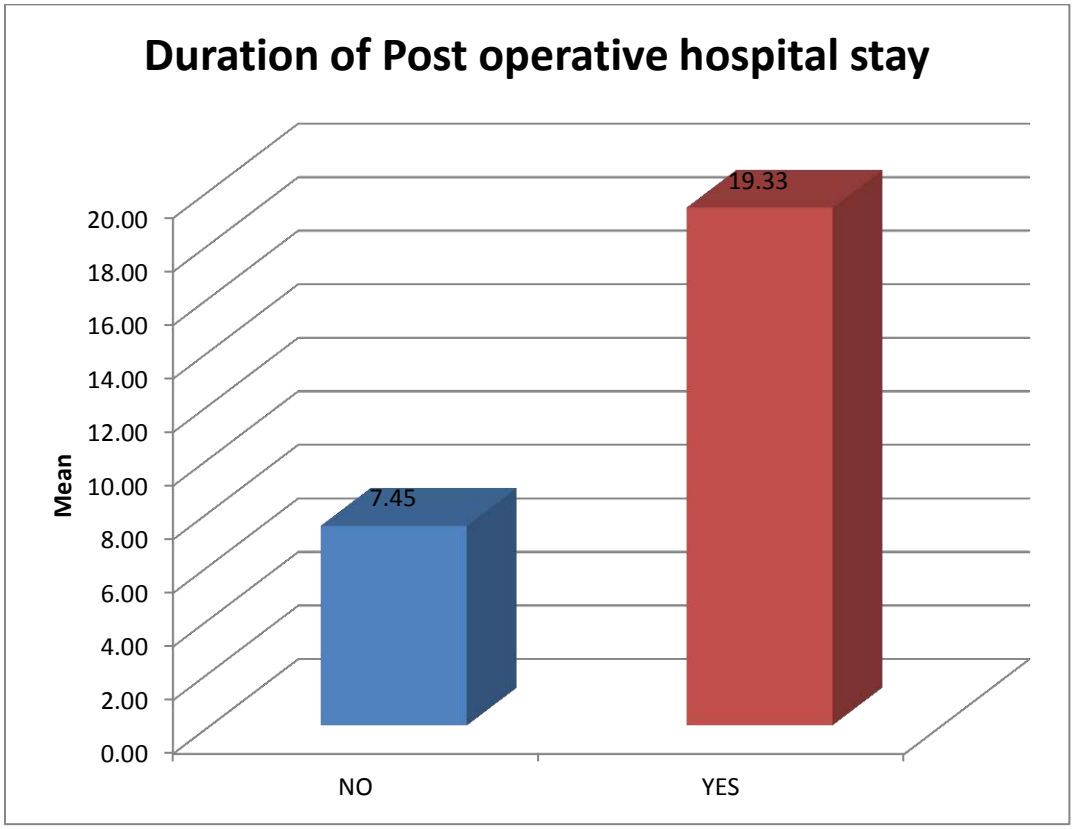
14) Duration of post operative hospital stay:

Median duration of post operative hospital stay in VATS group was (7.45±1.01days) that was shorter than those converted in open thoracotomy (19.33±3.21 days).

TABLE 14- Duration of post operative hospital stay of patients underwent VATS and the patients converted into the open thoracotomy

Conversion of vats to open thoracotomy	NO		YES	
	Mean	SD	Mean	SD
Duration of Post operative hospital stay	7.45	1.01	19.33	3.21

FIGURE 14- Duration of post operative hospital stay of patients underwent VATS and the patients converted into the open thoracotomy



15) Time to return to work:

It has been observed that mean time for VATS patients to return to work was (16.74 ±4.54 days) which was significantly shorter than the patients that was converted into open procedure (28.33±5.77 days)

TABLE 15- Time to return to work of the patients underwent VATS and the patients converted into open thoracotomy

Conversion of VATS to open thoracotomy	NO		YES	
	Mean	SD	Mean	SD
Time to return to work	16.74	4.54	28.33	5.77

FIGURE 15- Time to return to work of the patients underwent VATS and the patients converted into open thoracotomy

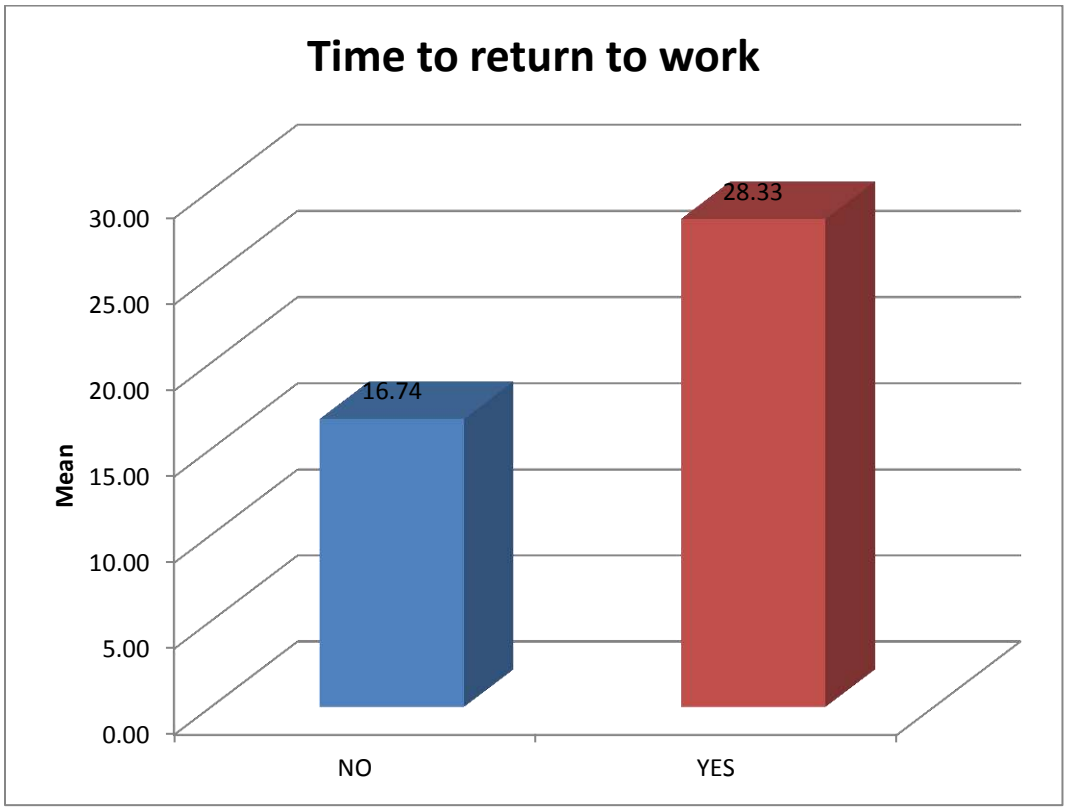


Table 16- Comparison of Age, Sex, Duration of surgery, Intra-operative complications, Post-operative complications, Chest tube day of removal, Duration of post-operative hospital stay, Time to return to work between tubercular and non- tubercular groups

		T.B.				Chi-square value/Z	p-value
		NO (n=21)		YES (n=20)			
Age Group	1-10	1	4.8%	0	0.0%	8.735	0.365
	11-20	2	9.5%	0	0.0%		
	21-30	0	0.0%	1	5.0%		
	31-40	1	4.8%	0	0.0%		
	41-50	4	19.0%	5	25.0%		
	51-60	9	42.9%	5	25.0%		
	61-70	3	14.3%	5	25.0%		
	71-80	1	4.8%	3	15.0%		
	81-90	0	0.0%	1	5.0%		
Sex	F	11	52.4%	8	40.0%	0.631	0.427
	M	10	47.6%	12	60.0%		
Duration of surgery (Mins)		274.29	35.86	286.50	55.18	-0.845	0.404
Intraoperative complications	NO	15	71.4%	15	75.0%	0.067	0.796
	YES	6	28.6%	5	25.0%		
Bleeding	NO	15	71.4%	15	75.0%	0.067	0.796
	YES	6	28.6%	5	25.0%		
Need for blood transfusion	NO	15	71.4%	15	75.0%	0.067	0.796
	YES	6	28.6%	5	25.0%		
Conversion of vats to open thoracotomy (Yes/No)	NO	19	90.5%	19	95.0%	0.309	0.578
	YES	2	9.5%	1	5.0%		

(If Yes) Reasons for conversion	Adhesions and bleeding	0	0.0%	1	5.0%	2.977	0.226
	Bleeding	2	9.5%	0	0.0%		
	NO	19	90.5%	19	95.0%		
Postoperative Complications	NO	17	81.0%	18	90.0%	0.671	0.413
	YES	4	19.0%	2	10.0%		
Need for blood transfusion	NO	21	100.0%	19	95.0%	1.076	0.300
	YES	0	0.0%	1	5.0%		
Bleeding	NO	21	100.0%	19	95.0%	1.076	0.300
	YES	0	0.0%	1	5.0%		
Air Leak	NO	18	85.7%	19	95.0%	1.003	0.317
	YES	3	14.3%	1	5.0%		
Chest tube day of removal		8.52	3.06	8.50	2.70	0.026	0.979
Duration of Post operative hospital stay		8.43	4.19	8.20	2.28	0.215	0.831
Time to return to work		18.57	6.33	16.55	4.36	1.185	0.243
Outcome	Discharged	21	100.0%	19	95.0%	1.076	0.300
	Discharged On Request	0	0.0%	1	5.0%		

1. Age group

a) In non tubercular group :

1 patient (4.8%) was in age group of (1-10) years,2 patients (9.5%) were in age group of (11-20)years, 1 patient (4.8%) was in age group of(31-40)years, 3 patients out of 21 were in age group of (41-60)years, 3 patients (14.3%) were in age group of (61-70) years,1 patient(4.8%) was in 71-80 year age group .

b) In tubercular group :

1 out of 20 patients (5%) who had tuberculosis was in age group of (21-30) years ,15 patients out of 20 were in age group of(41-70) years, 3 patients (15%) were in age group of (71-80)years and 1 patient (5%) in (81 – 90) years.

2. Sex:

a) In non tubercular group :

Out of 21 patients,11 patients (52.4 %) were females and 10 patients (47.6%) were males .

b) In tubercular group :

Out of 20 patients, 8 patients (40 %) were females and 12 patients (60%) were males. Female: Male= 2:3.

3. Intraoperative complications :

a) **In non tubercular group** :

Out of 21 patients 15 patients (71.4%) had no intraoperative complications and 6 patients (28.6%) had intraoperative bleeding and needed blood transfusion.

b) In tubercular group :

Out of 20 patients 15 patients (75%) had no intraoperative complications and 5 patients (25%) had intraoperative bleeding and needed blood transfusion (p value= .067).

-Conversion to open thoracotomy procedure :

a) In non tubercular group :

Out of 21 patients , 2 patients (9.5%) were converted to open thoracotomy due to intraoperative bleeding .

b) In tubercular group :

1 patient (15%) out of 20 patients was converted to open thoracotomy procedure due to intraoperative bleeding and adhesions .

4. Duration of Surgery:

a) In non tubercular group :

Mean duration of surgery in patients with tuberculosis was 274 ± 35.86 minutes

b) In tubercular group :

Mean duration of surgery was 286 ± 55.18 minutes.

The operative time was more in patients converted to open thoracotomy.

5. Post operative complications :

a) In non tubercular group:

Out of 21 patients , 4 patients had post operative complications that is air leak .

b) In tubercular group :

Out of 20 patients 2 patients (10%) had post operative complications 1 patient (5%) had post operative bleeding and need blood transfusion and 1 patient (5%) had air leak .

6. Chest tube day of removal:

a) In non tubercular group :

Mean chest tube drainage was 8.52 ± 3.06 days

b) In tubercular group :

Mean chest tube drainage was 8.50 ± 2.70 days

7. Duration of post operative hospital day:

a) In non tubercular group:

Mean duration of post operative hospital day was 8.43 ± 4.1 days

b) In tubercular group :

Mean duration of post operative hospital day was 8.20± 2.28 days

8. Mean time to return to work:

a) In non tubercular group :

Mean time to return to work was 18.57 ± 6.33 days

b) In tubercular group :

Mean time to return to work was 16.85± 4.36 days

DISCUSSION

Since its introduction VATS has evolved as a popular surgical approach for various thoracic diseases with very promising results. As more and more experience adds up, the indications of VATS are diversifying and increasing enthusiasm among surgeons has led to VATS being preferred over open thoracotomy these days. Despite several studies implying better surgical outcomes and decreased morbidity with VATS, the debate still prevails regarding the safety and efficacy of the procedure. In our study we studied the clinical spectrum and outcome of VATS pulmonary resections including the intraoperative and postoperative complications, need for analgesics, need for blood transfusion, chest tube drainage time, need for open thoracotomy and 30 days follow up in one and half year.

There were 22 males (53.7%) and 19 females (46.3%) with mean age of 53.4 years and range being 07-87 years. Tomas A. Angelillo Mackinlay[71] found a similar range of 15-82 years and men aged 49 years in his research of 64 cases in 1996. In another study of 53 individuals, Tomas A. Angelillo Mackinlay et al [72] found that there was predominance of male gender, similar to that obtained in our study.

There was a significant association seen with the past history of tuberculosis in our study, a likely result of India being the country with the highest burden of tuberculosis.[73] Tuberculosis is recognised as a major risk factor for thoracic empyema and other thoracic disorders.[74-76]

In our study,41 patients underwent VATS procedure in which 22 patients (53.7%) patients went through VATS lobectomy.12 patients (29.7%)went through VATS bullectomy,5 patients (12.20%) underwent VATS pneumonectomy and 1 patient (2.4%) underwent wedge resection and VATS segmentectomy each. Out of 41 patients, 3 patients were converted into open procedure for various reasons like presence of dense adhesions and excessive bleeding. Conversion rate in our study was 7.32%.

According to other research, the conversion rate from VATS to open thoracotomy ranges from 1.6% to 19%.[10,77-80]

In his study,Rodney J. Landeeneau[81] (1995) reported a conversion rate of 17% (n=9), with the majority of patients suffering from chronic empyema. The conversion rate in our study was caused by association of individuals with a history of tuberculosis. Due to prolonged inflammation, ruined lung, pleural thickening, dense adhesions, and cavity development are prevalent in tuberculosis, and this becomes the most difficult hurdle to the safe completion of the VATS, increasing the necessity for conversion to the open procedure.

In our study, the common indications of surgery were tubercular lung (48.78%), spontaneous pneumothorax (26.8%), fungal diseases (17.1%), carcinoma lung (14.6%),pneumonia with empyema (9.8%), cystic teratoma and bronchopleural fistula and bronchovasuclar fistula in 2.4% of patients each**.** Mean duration of surgery for VATS was 274.47 ±40.11mins. and that converted to open was353.33 ± 64.29 mins. This difference in mean duration of surgery was found to be significant. Data from 752 patients in the American College of Surgeons oncology group Z0030 randomised clinical trial [19] in 2010 also suggestted that VATS lobectomy (117.5 minutes) takes less time than open thoracotomy lobectomy (171.5 minutes). After excluding converted cases from his study, Liang C [82] found that VATS had a shorter operational time (193.24 ±72.64 minutes) than open thoracotomy (208.05± 61.97 minutes).

In our study, Out of 41 patients, 37 patients (90.2%) had no intraoperative complications whereas 4 patients (9.8%) patients had intraoperative bleeding and need blood transfusion. Out of these 4 patients, 2 patients were converted to open thoracotomy due to bleeding and 1 patient converted to open thoracotomy due to adhesions and bleeding. A recent study by Andreetti et al [83] compared VATS lobectomy to an open muscle-sparing mini-thoracotomy and found that the frequency of serious intraoperative complication during VATS lobectomy was low and

equivalent to open lobectomy. In our study, the frequency of post operative complications was also lesser for VATS group.

About 4 patients (9.7%) had postoperative complications. 4 patients had prolonged air leak and 1 patient out of 4 also had post operative bleeding and needed blood transfusion. About 4 patients had post operative complications of which frequency was least in VATS n=1 (2.4%). Falcoz et al [84] conducted another propensity-matched outcome analysis comparing VATS with open lobectomy for primary lung cancer in 2015, using data from the European Society of Thoracic Surgeons database of 2,721 patients. They found that the VATS group had considerably less postoperative problems than the open thoracotomy group (29.1% vs. 31.7%, p=0.03). Due to the minimal invasiveness of the procedure, limited incision, no need of rib spreading and minimal intraoperative manipulation, it is implied and well proven in the literature so far that postoperative pain and analgesic requirement is lesser in the patients undergoing VATS. This can be a result of the intercostal neuralgia that occurs due to injury to the intercostal nerves when access is gained to the thoracic cavity by spreading the ribs and dissecting the pleura. In our study, for adequate analgesia, opoids and NSAIDS and were given. The required mean total dose of NSAIDS in post operative period was (789.47± 146.66 mg) which was lesser than that of patients converted into open thoracotomy 1300±458.26 mg). The mean total dose of post operative opoids was (239.47±127 mg) which was lesser than that of patients that was converted to open procedure (450±0 mg). The mean total no of days for which NSAIDS has to be given was nearly half in patient underwent VATS (2.61±0.55 days) as compared to the patients which was converted into open thoracotomy (4.33±1.53 days). The mean total no of days for which opoids was given to VATS group were (1.66±0.81 days) which were lesser than the group that was converted into open (3±0.0 days) Lower pain scores were seen in individuals who underwent VATS lobectomy in a research by Andreetti et al.[83]

The differences between mean postoperative pain values were significant at 1, 12, 24 and 48 h (6.24 vs. 8.74, 5.16 vs. 7.66, 4.19 vs. 6.89, 2.23 vs. 5.33; P=0.000). Demmy and Nwogu validated the greater efficacy of VATS in terms of postoperative pain and quality of life as compared to open thoracotomy in their study.[85] VATS has a lower frequency of intraoperative and postoperative complications, as well as less postoperative pain and analgesic requirement. Another expected benefit of VATS is faster recovery and thus shorter duration of postoperative chest tube drainage and hospital stay, with faster return to normal daily activities. In our study, mean duration of chest tube drainage in VATS group was (7.84±1.53 days) and that converted in open thoracotomy was (9.67 ± 0.58 days). Median duration of post operative hospital stay in VATS group was (7.45± 1.01days) that was shorter than the patients underwent open thoracotomy (19.33±3.21 days).Mean time for VATS patients to return to work was (16.74 ±4.54 days) which was significantly shorter than the patients that were converted into open procedure(28.33±5.77 days) a significant difference. These results are consistent with the results observed in various other studies. Sukki Cho [86] and colleagues discovered that patients who received VATS lobectomy had significant reductions in both chest tube duration (5.4 vs 9.1 days; p = 0.000) and length of hospital stay (7.1 vs 12.0 days; p = 0.000).Suat Erus[80] in 2014 found that the length of postoperative stay was significantly shorter for the VATS group. Mohammad I Al-Tarshihi[87] conducted a retrospective analysis involving 82 patients who received either video-assisted thoracoscopic surgery or open procedure through axillary thoracotomy between March 2002 and March 2007. He reported that there was a significant difference between the two groups at the 1-month follow-up, with most of the patients in group A returning to work, while only about half of the patients in group B returned to work at this time, which was attributed to the incisional pain of the performed thoracotomy.

In our study, we concluded that VATS is a safe, practical and therapeutic modality in terms of lesser surgical time, lesser need of analgesic requirement, blood transfusion, intraoperative, postoperative complications and hospital stay.

In our study, we have also seen duration of surgery, intraoperative complications , postoperative complications, chest tube day of removal, duration of hospital stay , time to return to work between patients who had tuberculosis with that who did not have tuberculosis .In non tubercular group patients ; 1 patient (4.8%) was in age group of (1-10 years),2 patients (9.5%) were in age group of (11-20)years, 1 patient (4.8%) was in age group of(31-40)years, 3 patients out of 21 were in age group of (41-60)years, 3 patients (14.3%) were in age group of (61-70) years,1 patient(4.8%) was in 71-80 year age group .In tubercular group patients **;** 1 out of 20 patients (5%) who had tuberculosis was in age group of (21-30) years ,15 patients out of 20 were in age group of(41-70) years, 3 patients (15%) were in age group of (71-80)years and 1 patient (5%) in (81 – 90) years. In non-tubercular patients out of 21 patients, 11 patients (52.4 %) were females and 10 patients (47.6%) were males. In tubercular patients out of 20 patients, 8 patients (40 %) were females and 12 patients (60%) were males. Study conducted by Arvind et.al [88] in which he compared the outcome of surgery for tubercular and non-tubercular empyema in which males were more than females in tubercular group than in non-tubercular group similar to that obtained in our study.

In patients having tuberculosis, out of 21 patients , 15 patients (71.4%) had no intraoperative complications and 6 patients (28.6%) had intraoperative bleeding and needed blood transfusion .In tubercular patients group ,out of 20 patients 15 patients (75%) had no intraoperative complications and 5 patients (25%) had intraoperative bleeding and needed blood transfusion(p value = .796). In non tubercular group out of

21 patients, 2 patients (9.5%) were converted to open thoracotomy due to intraoperative bleeding and in tubercular group1 patient (15%) out of 20 patients was converted to open thoracotomy procedure due to intraoperative bleeding and adhesions (p value =.0578).In study conducted by Arvind et.al[88], tubercular group patients didn't have intra-operative bleeding while 2 patients of non-tubercular group had intra-operative bleeding. In non tubercular group patients mean duration of surgery was 274 ± 35.86 minutes whereas in patients having tuberculosis mean duration of surgery was 286 ± 55.18 minutes (p value = 404). In study conducted by Arvind et.al[88], he concluded that mean operative time along with mean intra-operative loss was significantly higher in non-tubercular group.

In non tubercular group, out of 21 patients , 4 patients had post operative air leak whereas in non-tubercular group, 1 patient (5%) had post operative bleeding and needed blood transfusion and 1 patient (5%) had air leak .In study conducted by Arvind et.al[88], no difference between two groups in post operative air leak , similar to that obtained in our study. Mean chest tube drainage was 8.52 ± 3.06 days in patients who did not have tuberculosis and in tubercular group patients mean chest tube drainage was (8.50 ± 2.70 days) (p value = 979). In study conducted by Arvind et.al [88], no difference between two groups in total ICD drainage the result similar to that obtained in our study. In a prospective comparative analysis of 75 cases of tubercular and non-tubercular empyema by Kundu et.al.[89] the authors reported that tubercular group required prolonged intercostal drainage. Mean duration of post operative hospital stay in non tubercular group patients was 8.43 ± 4.1 days whereas in tubercular group patients day was 8.20 ± 2.28 days (p value = .831). In patients who did not have tuberculosis mean time to return to work was 18.57 ± 6.33 days and in tubercular group patients ,mean time to return to work was 16.85 ± 4.36 days (p value =.243).In study

conducted by Arvind et.al[88], total duration of hospital stay along with time to return to work was significantly shorter in tubercular group.

In our study, we have also seen duration of surgery, intraoperative complications, postoperative complications, chest tube day of removal, duration of hospital stay, time to return to work between patients who had tuberculosis with that who did not have tuberculosis and we have concluded that, there is no significant difference between these two groups (p value insignificant).

SUMMARY AND CONCLUSION

Total 41 patients underwent surgical intervention for various thoracic diseases. Mean age of patients was 53.44 years .19 patients (46.3%) were females and 22 (53.7%) were males. Out of 41 patients, 39patients underwent VATS while 3 patients were those who were initially taken up for VATS and later on the procedure had to be converted to open thoracotomy for various reasons. However this brought no harm to the patient and the 2 patients were discharged in satisfactory condition and 1 patient discharged on request.

The common indications of surgery were tubercular lung (48.78%), spontaneous pneumothorax (26.8%), fungal diseases (17.1%), carcinoma lung (14.6%), pneumonia with empyema (9.8%), cystic teratoma, bronchopleural fistula and bronchovasuclar fistula in 2.4% of patients each. Various surgical modalities were used ;22 patients (53.7%) patients underwent VATS lobectomy,12 patients (29.7%) underwent VATS bullectomy, 5 patients (12.20%) had undergo VATS pneumonectomy,1 patient (2.4%) underwent wedge resection and segmentectomy each. 3 patients out of 41 were converted into open thoracotomy. Mean duration of surgery was shorter in patients underwent VATS (274.47 ±40.11minutes) than that of patients which were converted in open procedure (353.33 ± 64.29 minutes). Intraoperative complications were less in the patients that underwent VATS than that of the patients which were converted into open thoracotomy.3 patients were converted into open thoracotomy had intraoperative bleeding and need blood transfusion and 1 patient had adhesions along with bleeding.

The postoperative pain and analgesic requirement was significantly higher for the patients that were converted into open thoracotomy, thus resulting in the increased morbidity. Out of 41 patients,4 patients (9.7%) had postoperative complications, frequency was least for the VATS group; only 1 patient had prolonged air leak and all the patients converted

into open thoracotomy had prolonged air leak and 1 patient also had bleeding along with prolonged air leak. Mean chest tube drainage duration in VATS group was (7.84±1.53 days) and that converted in open thoracotomy was (17.00±1.73 days).

The mean hospital stay was 7.45 days for VATS and 19.33 days for the patients that converted into open thoracotomy. No mortality was noticed in the period of hospital stay. Mean time to return to work for VATS patients was significantly shorter than the patients that were converted into open thoracotomy.

According to the evidence, VATS is a safe, practical, and effective therapeutic modality. In our experience, VATS is preferable to open thoracotomy in terms of lesser surgical time, blood loss, less postoperative discomfort and analgesic demand, shorter hospitalisation and chest tube drainage duration, and faster return to regular activities. In addition to lower perioperative morbidity, VATS has a lower rate of perioperative complications.

Our study also demonstrates that VATS may need to be converted to a standard open operation at times; nevertheless, this conversion should not be considered as a failure but as a safety measure.

As a result, our study recommends that VATS, a minimally invasive surgery with lower perioperative morbidity and a better functional outcome, should be considered over traditional open thoracotomy whenever possible.

In our study, we have also seen duration of surgery, intraoperative complications, postoperative complications, chest tube day of removal, duration of hospital stay, time to return to work between patients who had tuberculosis with that who did not have tuberculosis and we have concluded that, there is no significant difference between these two groups (p value insignificant).

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PROFORMA

Sr. No.

Patient demographics

- Name
- Age
- Gender
- Admission No
- MRD No
- Date of admission
- Date of surgery
- Date of discharge
- Occupation
- Address
- Chief complaints
- HOPI
- Past History

▪ Hypertension
▪ Diabetes mellitus
▪ Bronchial asthma
▪ Tuberculosis
▪ COPD
▪ History of smoking

Signature of Candidate **Signature of Supervisor**

▪ Bleeding disorders
▪ Others if any
▪ Previous treatment ▪ If yes .....
▪ Previous surgery ▪ If yes .....

GENERAL PHYSICAL EXAMINATION

- Sensorium
- Vitals

▪ BP
▪ Heart rate
▪ Respiratory rate
▪ Temperature
▪ Spo2
▪ Pallor
▪ Icterus
▪ Cyanosis
▪ Oedema
▪ Lymphadenopathy
▪ Clubbing

Signature of Candidate **Signature of Supervisor**

RESPIRATORY SYSTEM

▪ Inspection
▪ Palpation
▪ Percussion
▪ Auscultation

CARDIOVASCULAR SYSTEM

ABDOMEN

CENTRAL NERVOUS SYSTEM

- **PREOPERATIVE ASSESMENTS**

▪ Blood investigations 1. TLC 2. HB 3. Platelet Count 4. ABG 5. PTI/INR 6. Any other investigations according to comorbid condition
▪ Chest XRAY'S
▪ CT Chest (Date)
▪ Pulmonary function test

- **CLINICAL DIAGNOSIS**
- **SURGICAL RELATED DATA**
- Type of anaesthesia
- Type of surgery

Signature of Candidate **Signature of Supervisor**

- Duration of surgery (minutes)
- Use of stapler
- Biopsy taken / not taken
- Intraoperative complications

▪ Bleeding
▪ Need for blood transfusion
▪ Conversion of VATS to open thoracotomy If yes ……
▪ Others

Surgery results

- Postoperative pain by visual analogue scale

0 day
3rd day
7th day
1 month

- Postoperative analgesic requirement

Type	NSAIDS	OPIODS
Dose		
No of days		

- Chest tube drainage

Day of removal

- Postoperative complications

Signature of Candidate **Signature of Supervisor**

▪ Bleeding
▪ Air leak
▪ Need for blood transfusion
▪ Others

- Length of hospital stay _____ No of days

- Time to return to normal work
- Biopsy report
- Postoperative x ray

O day
3rd day
At time of follow up

- Need for readmission within 1 month yes/ no

- Need for reintervention yes/no
- Outcome

▪ Improved
▪ Cured
▪ Discharge
▪ DAMA
▪ Death

Signature of Candidate **Signature of Supervisor**

Sr. No	Name	AGE	AGE FROUP	SEX	CR NO.	ADM NO	Date of Adm.	Date of Surgery	Date of Discharge	Hypertension	Diabetes	COPD	T.B.	Bronchial Asthma	Smoking histoty
1	DR	56	51-60	M	34576	6624	06-Mar-21	07-Mar-21	12-Mar-21	YES	NO	NO	NO	NO	YES
2	HK	54	51-60	M	98765	7865	10-Mar-21	11-Mar-21	18-Mar-21	YES	NO	NO	NO	YES	YES
3	PS	40	41-50	F	23456	8534	15-Mar-21	17-Mar-21	21-Mar-21	NO	NO	NO	NO	NO	YES
4	UK	57	51-60	F	87453	9887	20-Mar-21	21-Mar-21	27-Mar-21	NO	YES	NO	YES	NO	NO
5	JL	65	61-70	M	76324	4532	02-Apr-21	03-Apr-21	19-Apr-21	YES	NO	NO	YES	YES	NO
6	AR	45	41-50	M	34986	9842	05-Apr-21	06-Apr-21	11-Apr-21	NO	YES	NO	NO	NO	YES
7	PS	65	61-70	M	56479	7609	15-Apr-21	17-Apr-21	22-Apr-21	YES	NO	NO	YES	YES	YES
8	KI	69	61-70	F	34986	5123	05-May	06-May-21	12-May-21	NO	NO	NO	YES	NO	NO
9	NT	76	71-80	M	89675	9767	15-May-21	16-May-21	02-Jun-21	YES	NO	NO	YES	YES	NO
10	LK	54	51-60	F	45367	7654	28-May-21	29-May-21	03-Jun-21	NO	NO	NO	NO	NO	NO
11	TG	61	61-70	M	87324	9876	30-May-21	31-May-21	04-Jun-21	NO	YES	NO	YES	YES	NO
12	RS	59	51-60	F	98456	8763	01-Jun-21	02-Jun-21	07-Jun-21	NO	NO	NO	YES	YES	NO
13	HU	54	51-60	M	89766	6789	07-Jun-21	08-Jun-21	15-Jun-21	NO	YES	NO	YES	NO	NO
14	JK	76	71-80	F	76543	9876	16-Jun-21	17-Jun-21	21-Jun-21	YES	NO	NO	YES	NO	NO
15	NK	54	51-60	M	98765	3456	20-Jun-21	21-Jun-21	25-Jun-21	NO	YES	NO	NO	NO	NO
16	KL	49	41-50	F	34567	8712	05-Jul-21	06-Jul-21	12-Jul-21	NO	NO	NO	YES	NO	YES
17	JU	56	51-60	M	98234	9845	10-Jul-21	11-Jul-21	16-Jul-21	YES	YES	NO	YES	NO	YES
18	DR	54	51-60	M	90875	6578	13-Jul-21	14-Jul-21	20-Jul-21	NO	YES	NO	NO	NO	YES
19	GT	50	41-50	M	67543	4576	29-Jul-21	30-Jul-21	04-Aug-21	YES	NO	NO	YES	YES	YES
20	M	11	11-20	F	38830	6586	02-Aug-21	04-Aug-21	09-Aug-21	NO	NO	NO	NO	NO	NO
21	AS	76	71-80	F	87609	9823	12-Aug-21	13-Aug-21	18-Aug-21	NO	NO	NO	YES	NO	NO
22	CK	40	31-40	F	63363	5072	28-Aug-21	01-SEPT-21	04-Sep-21	YES	NO	NO	NO	NO	NO
23	KS	45	41-50	M	22356	9876	09-Sep-21	12-SEPT-21	16-SEPT-21	YES	NO	NO	YES	NO	YES
24	MS	60	51-60	M	69719	9539	05-SEPT-21	07-SEPT-21	27-SEPT-21	NO	NO	NO	YES	NO	YES
25	BG	54	51-60	F	76543	9087	05-SEPT-21	7-SEPT-21	11-Sept21	NO	NO	NO	NO	NO	NO
26	NK	62	61-70	F	61131	7896	10-SEPT-21	14-SEPT-21	17-SEPT-21	YES	YES	NO	NO	NO	NO
27	PK	67	61-70	F	98745	8763	10-SEPT-21	11-Nov-21	15-Nov-21	YES	NO	NO	NO	YES	NO
28	OL	56	51-60	F	78956	2398	08-Nov-21	09-Nov-21	13-Nov21	YES	YES	NO	NO	NO	NO
29	HJ	56	51-60	F	78965	9189	15-Nov-21	16-Nov-21	22-Nov-21	YES	NO	NO	NO	NO	NO
30	NH	41	41-50	M	90912	4934	20-Nov-21	21-Nov-21	27-Nov-21	NO	YES	NO	NO	NO	NO
31	DR	87	81-90	M	87634	7198	01-Dec-21	02-Dec-21	18-Dec-21	YES	YES	NO	YES	YES	NO
32	SJ	45	41-50	M	80093	8754	03-Dec-21	04-Dec-21	10-Dec-21	NO	NO	NO	YES	NO	NO
33	PL	58	51-60	M	67432	8765	15-Dec-21	16-Dec-21	20-Dec-21	NO	YES	NO	NO	NO	NO
34	UL	61	61-70	M	91289	6789	18-Dec-21	19-Dec-21	24-Dec-21	YES	NO	NO	NO	NO	NO
35	MK	46	41-50	M	29325	0662	04-Jan-22	11-Jan-22	08-Jan-22	NO	NO	NO	YES	NO	NO
36	PS	19	11-20	F	23891	289	19-Apr-22	21-Apr-22	26-Apr-22	NO	NO	NO	NO	NO	NO
37	MS	3	1-10	M	30676	5937	17-May-22	20-May-22	26-May-22	NO	NO	NO	NO	NO	NO
38	D	78	71-80	F	31345	7804	20-May-22	03-Jun-22	29-May-22	NO	YES	NO	NO	NO	NO
39	P	28	21-30	F	33171	1101	27-May-22	30-May-22	04-Jun-22	NO	NO	NO	YES	NO	NO
40	R	41	41-50	F	72279	5097	04-Jun-22	06-Jun-22	10-Jun-22	NO	NO	NO	NO	NO	NO
41	A	63	61-70	M	38897	6625	15-Aug-22	17-Aug-22	23-Aug-22	NO	YES	NO	YES	NO	NO

Sr. No	Bleeding Disorders	Any previous treatment	Any previous surgery	CXR
1	NO	ATT	NO	LEFT LUNG COLLAPSE
2	NO	ATT	NO	LEFT PNEUMOTHORAX WITH BULLA
3	NO	NO	NO	LEFT UPPER LOBE CAVITY
4	NO	ATT	NO	RIGHT LUNG COLLAPSE
5	NO	NO	NO	RIGHT UPPER LOBE MASS
6	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
7	NO	ATT	NO	LEFT UPPER LOBE CAVITY
8	YES	ATT	NO	RIGHT LUNG COLLAPSE
9	NO	ICD INSERTION	NO	LEFT HYDROPNEUMOTHORAX WITH BULLA
10	NO	ICD INSERTION	NO	RIGHT PLEURAL EFFUSION
11	NO	ATT	NO	RIGHT LUNG COLLAPSE
12	NO	ATT	NO	LEFT LUNG COLLAPSE
13	NO	ATT	NO	RIGHT LUNG COLLAPSE
14	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
15	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
16	NO	ATT	NO	RIGHT LUNG COLLAPSE
17	NO	NO	NO	RIGHT UPPER LOBE MASS
18	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
19	NO	NO	NO	LEFT UPPER LOBE CAVITY
20	NO	NO	NO	LEFT UPPER LOBE MASS
21	NO	ATT	NO	RIGHT LUNG COLLAPSE
22	NO	NO	NO	LEFT HYDROPNEUMOTHORAX
23	NO	ATT	NO	LEFT HYDROTHORAX
24	NO	NO	NO	RIGHT UPPER LOBE CAVITY
25	NO	ICD INSERTION	NO	LEFT HYDROPNEUMOTHORAX WITH BULLA
26	NO	ATT	NO	RIGHT LOWER LOBE CAVITATORY LESION
27	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
28	NO	ICD INSERTION	NO	RIGHT PLEURAL EFFUSION
29	NO	NO	NO	RIGHT PLEURAL EFFUSION
30	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
31	NO	ATT	NO	LEFT UPPER LOBE CAVITY
32	NO	ATT	NO	RIGHT LUNG COLLAPSE
33	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
34	NO	NO	NO	RIGHT PNEUMOTHORAX WITH BULLA
35	NO	ATT	NO	RIGHT LUNG COLLAPSE
36	NO	ICD INSERTION	NO	RIGHT PNEUMOTHORAX WITH BULLA
37	NO	ICD INSERTION	NO	RIGHT PLEURAL EFFUSION
38	NO	NO	NO	RIGHT UPPER LOBE CAITY
39	NO	ATT	NO	RIGHT LUNG COLLAPSE
40	NO	NO	NO	RIGHT UPPER LOBE MASS
41	NO	ATT	NO	RIGHT UPPER LOBE CAVITY

Sr. No	CT Chest	PFT	DIAGNOSIS1
1	LEFT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	LEFT LUNG COLLAPSE
2	LEFT PNEUMOTHORAX WITH SUBPLEURAL BULLAE LEFT LUNG	OBSTRUCTIVE PATTERN	LEFT PNEUMOTHORAX WITH BULLA
3	SMALL CELL CARCINOMA LEFT LOBE	NORMAL	LEFT UPPER LOBE CAVITY
4	RIGHT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	RIGHT LUNG COLLAPSE
5	MODERATE DIFFUSE ALVEOLAR CARCINOMA	OBSTRUCTIVE PATTERN	RIGHT UPPER LOBE MASS
6	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	OBSTRUCTIVE PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
7	THICK WALLED CAVITATORY LESION IN LEFT UPPER LOBE LIKELY FUNGUS	OBSTRUCTIVE PATTERN	LEFT LOBE CAITY
8	RIGHT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	RIGHT LUNG COLLAPSE
9	LEFT PNEUMOTHORAX WITH SUBPLEURAL BULLAE LEFT LUNG	OBSTRUCTIVE PATTERN	LEFT PNEUMOTHORAX WITH BULLA
10	NECROTISING PNEUMONIA RIGHT LOWER LOBE WITH EMPYEMA	MIXED PATTERN	RIGHT PLEURAL EFFUSION
11	RIGHT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	RIGHT LUNG COLLAPSE
12	LEFT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	LEFT LUNG COLLAPSE
13	RIGHT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	RIGHT LUNG COLLAPSE
14	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	MIXED PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
15	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	MIXED PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
16	RIGHT FIBROBRONCHECTATIC CAVITY	NORMAL PATTERN	RIGHT LUNG COLLAPSE
17	MODERATE DIFFUSE ALVEOLAR CARCINOMA	NORMAL PATTERN	RIGHT UPPER LOBE MASS
18	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	NORMAL PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
19	THICK WALLED CAVITATORY LESION IN LEFT UPPER LOBE LIKELY FUNGUS	NORMAL PATTERN	LEFT LOBE CAITY
20	LEFT UPPER LOBE CYSTIC TERATOMA	NAD	LEFT UPPER LOBE MASS
21	RIGHT FIBROBRONCHECTATIC CAVITY	MIXED PATTERN	RIGHT LUNG COLLAPSE
22	MULTILOCULAR HYDROPNEUMOTHORAX WITH BRONCHOPLEURAL FISTULA	OBSTRUCTIVE PATTERN	LEFT HYDROPNEUMOTHORAX
23	LEFT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	LEFT HYDROTHORAX
24	COMBINED SMALL CELL CARCINOMA WITH ADENOCARCINOMA WITH ASPERGILLOMA	MIXED PATTERN	RIGHT UPPER LOBE CAVITY
25	LEFT PNEUMOTHORAX WITH SUBPLEURAL BULLAE LEFT LUNG	OBSTRUCTIVE PATTERN	LEFT PNEUMOTHORAX WITH BULLA
26	RIGHT UPPER LOBE FUNGAL BALL	OBSTRUCTIVE PATTERN	RIGHT LOWER LOBE CAVITATORY LESION
27	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	NORMAL PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
28	NECROTISING PNEUMONIA RIGHT LOWER LOBE WITH EMPYEMA	MIXED PATTERN	RIGHT PLEURAL EFFUSION
29	NECROTISING PNEUMONIA RIGHT LOWER LOBE WITH EMPYEMA	OBSTRUCTIVE PATTERN	RIGHT PLEURAL EFFUSION
30	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	MIXED PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
31	THICK WALLED CAVITATORY LESION IN LEFT UPPER LOBE LIKELY FUNGUS	MIXED PATTERN	LEFT LOBE CAITY
32	RIGHT FIBROBRONCHECTATIC CAVITY	NORMAL PATTERN	RIGHT LUNG COLLAPSE
33	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	OBSTRUCTIVE PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
34	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	OBSTRUCTIVE PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
35	RIGHT FIBROBRONCHECTATIC CAVITY	OBSTRUCTIVE PATTERN	RIGHT LUNG COLLAPSE
36	RIGHT PNEUMOTHORAX WITH SUBPLEURAL BULLAE RIGHT LUNG	RESTRICTIVE PATTERN	RIGHT PNEUMOTHORAX WITH BULLA
37	NECROTISING PNEUMONIA RIGHT LOWER LOBE WITH EMPYEMA	NAD	RIGHT PLEURAL EFFUSION
38	THICK WALLED CAVITATORY LESION IN RIGHT UPPER LOBE LIKELY FUNGUS	OBSTRUCTIVE PATTERN	RIGHT UPPER LOBE CAITY
39	RIGHT FIBROBRONCHECTATIC CAVITY WITH BRONCHOVASCULAR FISTULA	NORMAL	RIGHT LUNG COLLAPSE
40	NON SMALL CELL CARCINOMA	NORMAL	LEFT UPPER LOBE MASS
41	NODULAR LESION RIGHT UPPER LOBE	OBSTRUCTIVE PATTERN	RIGHT UPPER LOBE CAITATORY LESION

Sr. No	DIAGNOSIS	TYPE OF SURGERY	GROUP
1	LEFT TUBERCULAR LUNG	LEFT LOWER LOBE PNEUMONECTOMY	VATS
2	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	LEFT BULLECTOMY	VATS
3	SMALL CELL CARCINOMA	LEFT LUNG SEGMENTECTOMY	VATS
4	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE PNEUMONECTOMY	VATS
5	BIOPSY PROVEN MODERATE DIFFUSE ALVELOAR CARCINOMA	RIGHT UPPER LOBE LOBECTOMY	VATS
6	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
7	BIOPSY PROVEN ZYGOMYCOSIS LEFT UPPER LOBE	LEFT UPPER LOBE LOBECTOMY	VATS
8	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE PNEUMONECTOMY	VATS
9	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	LEFT BULLECTOMY	VATS
10	RIGHT LOWER LOBE NECROTISING PNEUMONIA WITH EMPYEMA	RIGHT LOWER LOBE LOBECTOMY	VATS
11	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE LOBECTOMY	VATS
12	LEFT TUBERCULAR LUNG	LEFT LOWER LOBE LOBECTOMY	VATS
13	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE LOBECTOMY	VATS
14	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
15	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
16	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE LOBECTOMY	VATS
17	BIOPSY PROVEN MODERATE DIFFUSE ALVELOAR CARCINOMA	RIGHT UPPER LOBE LOBECTOMY	VATS
18	BIOPSY PROVEN MODERATE DIFFUSE ALVELOAR CARCINOMA	RIGHT BULLECTOMY	VATS
19	BIOPSY PROVEN ZYGOMYCOSIS LEFT UPPER LOBE	LEFT UPPER LOBE LOBECTOMY	VATS
20	LEFT UPPER LOBE CYSTIC TERATOMA	LEFT UPPER LOBE LOBECTOMY	VATS
21	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE LOBECTOMY	VATS
22	STATUS POST COVID LUNG FIBROSIS WITH LEFT HYDROPNEUMOTHORAX WITH BRONCHOPLEURAL FISTULA	UPPER LEFT LOBE LOBECTOMY	VATS
23	LEFT TUBERCULAR LUNG	LEFT UPPER LOBECTOMY	VATS
24	COMBINED SMALL CELL CARCINOMA WITH ADENOCARCINOMA WITH ASPERGILLOMA	RIGHT LOBECTOMY	VATS
25	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	LEFT BULLECTOMY	VATS
26	RIGHT UPPER LOBE FUNGAL BALL	RIGHT LOWER LOBE LOBECTOMY	VATS
27	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
28	RIGHT LOWER LOBE NECROTISING PNEUMONIA WITH EMPYEMA	RIGHT LOWER LOBE LOBECTOMY	VATS
29	RIGHT LOWER LOBE NECROTISING PNEUMONIA WITH EMPYEMA	RIGHT LOWER LOBE LOBECTOMY	VATS
30	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
31	ASPERGILLOSIS WITH TUBERCULAR LUNG	LEFT UPPER LOBE LOBECTOMY	VATS
32	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE LOBECTOMY	VATS
33	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
34	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VATS
35	RIGHT TUBERCULAR LUNG	RIGHT LOWER LOBE PNEUMONECTOMY	VATS
36	BULLOUS LUNG DISEASES WITH RECURRENT PNEUMOTHORAX	RIGHT BULLECTOMY	VTAS
37	RIGHT LOWER LOBE NECROTISING PNEUMONIA WITH EMPYEMA	RIGHT LOWER LOBE LOBECTOMY	VATS
38	BIOPSY PROVEN ZYGOMYCOSIS RIGHT UPPER LOBE	RIGHT UPPER LOBE LOBECTOMY	VATS
39	RIGHT TUBERCULAR LUNG WITH BRONCHOVASCULAR FISTULA	RIGHT PNEUMONECTOMY	VATS
40	BIOPSY PROVEN NON SMALL CELL CARCINOMA	LEFT LUNG WEDGE RESECTION	VTAS
41	RIGHT UPPER LOBE FUNGAL BALL	RIGHT UPPER LOBE LOBECTOMY	VATS

Sr. No	Anaesthesia	Duration of surgery (Mins)	Use of stapler	Biopsy taken or not	intraoperative complications
1	GA	280 MINS	YES	YES	NO
2	GA	360MINS	YES	YES	YES
3	GA	280 MINS	YES	YES	NO
4	GA	240 MINS	YES	YES	NO
5	GA	280 MINS	YES	YES	YES
6	GA	290 MINS	YES	YES	NO
7	GA	390 MINS	YES	YES	YES
8	GA	290 MINS	YES	YES	NO
9	GA	260 MINS	YES	YES	NO
10	GA	280 MINS	YES	YES	YES
11	GA	260 MINS	YES	YES	YES
12	GA	280 MINS	YES	YES	NO
13	GA	240 MINS	YES	YES	NO
14	GA	280 MINS	YES	YES	NO
15	GA	280 MINS	YES	YES	NO
16	GA	240 MINS	YES	YES	NO
17	GA	260 MINS	YES	YES	NO
18	GA	290 MINS	YES	YES	NO
19	GA	240 MINS	YES	YES	NO
20	GA	240 MINS	YES	YES	NO
21	GA	260 MINS	YES	YES	NO
22	GA	280 MINS	YES	YES	NO
23	GA	360 MIN	YES	YES	NO
24	GA	380 MINS	YES	YES	YES
25	GA	290 MINS	YES	YES	NO
26	GA	240 MIN	YES	YES	NO
27	GA	280 MINS	YES	YES	NO
28	GA	260 MINS	YES	YES	NO
29	GA	260 MINS	YES	YES	NO
30	GA	240 MINS	YES	YES	NO
31	GA	400 MINS	YES	YES	YES
32	GA	290 MINS	YES	YES	NO
33	GA	280 MINS	YES	YES	NO
34	GA	270 MINS	YES	YES	NO
35	GA	360 MIN	YES	YES	NO
36	G A	180MINS	YES	YES	NO
37	G A	240 MINS	YES	YES	YES
38	GA	280 MINS	YES	YES	YES
39	GA	240 MINS	YES	YES	YES
40	GA	300 MINS	YES	YES	YES
41	GA	240 MIN	YES	YES	NO

Sr. No	Bleeding	Need for blood transfusion	Conversion of vats to open thoracotomy (Yes/No)	(If Yes) Reasons for conversion
1	NO	NO	NO	NO
2	YES	YES	NO	NO
3	NO	NO	NO	NO
4	NO	NO	NO	NO
5	YES	YES	YES	BLEEDING
6	NO	NO	NO	NO
7	YES	YES	NO	NO
8	NO	NO	NO	NO
9	NO	NO	NO	NO
10	YES	YES	NO	NO
11	YES	YES	NO	NO
12	NO	NO	NO	NO
13	NO	NO	NO	NO
14	NO	NO	NO	NO
15	NO	NO	NO	NO
16	NO	NO	NO	NO
17	NO	NO	NO	NO
18	NO	NO	NO	NO
19	NO	NO	NO	NO
20	NO	NO	NO	NO
21	NO	NO	NO	NO
22	NO	NO	NO	NO
23	NO	NO	NO	NO
24	YES	YES	YES	BLEEDING
25	NO	NO	NO	NO
26	NO	NO	NO	NO
27	NO	NO	NO	NO
28	NO	NO	NO	NO
29	NO	NO	NO	NO
30	NO	NO	NO	NO
31	YES	YES	YES	ADHESIONS AND BLEEDING
32	NO	NO	NO	NO
33	NO	NO	NO	NO
34	NO	NO	NO	NO
35	NO	NO	NO	NO
36	NO	NO	NO	NO
37	YES	YES	NO	NO
38	YES	YES	NO	NO
39	YES	YES	NO	NO
40	YES	YES	NO	NO
41	NO	NO	NO	NO

Sr. No	Post operative pain	0 POD	3rd POD	7th POD	1 Month	NSAID_Total Dose (mg)	NSAID_No of days	OPOIDs_Total Dose (mg)	OPOIDs_No of days
1		6	3	0	0	600	2	100	1
2		7	3	0	0	600	2	150	1
3		8	4	0	0	900	3	150	1
4		6	3	1	0	900	3	150	2
5		9	6	4	2	900	3	450	3
6		6	3	0	0	600	2	100	1
7		8	4	0	0	900	3	150	1
8		6	3	1	0	900	3	300	2
9		7	4	0	0	600	2	150	1
10		7	5	2	0	900	3	450	3
11		8	4	2	0	900	3	150	1
12		7	3	0	0	600	2	150	1
13		6	3	1	0	900	3	300	2
14		7	5	2	0	900	3	450	3
15		7	5	2	0	900	3	450	3
16		6	3	1	0	900	3	300	2
17		6	3	1	0	900	3	300	2
18		6	3	1	0	900	3	300	2
19		6	3	1	0	900	3	300	2
20		8	4	2	0	900	3	150	1
21		7	5	2	0	900	3	450	3
22		6	3	1	0	900	3	300	2
23		6	3	0	0	600	2	150	1
24		9	5	4	3	1800	6	450	3
25		6	3	1	0	900	3	300	2
26		7	4	0	0	600	2	150	1
27		7	5	2	0	900	3	450	3
28		8	4	2	0	900	3	150	1
29		7	3	0	0	600	2	150	1
30		8	4	2	0	900	3	150	1
31		9	7	5	4	1200	4	450	3
32		6	3	1	0	900	3	300	2
33		7	5	2	0	900	3	450	3
34		6	3	1	0	900	3	300	2
35		7	4	0	0	600	1	150	1
36		7	3	1	0	600	2	150	1
37		6	3	0	0	600	2	0	0
38		8	5	2	0	900	3	450	3
39		6	3	0	0	600	2	100	1
40		7	4	1	0	600	2	300	2
41		6	3	0	0	600	2	100	1

Sr. No	CHEST TUBE D	Postoperative Complications	Need for blood transfusion	Bleeding	PROLONGED AIR LEAK	BLOOD TRANSFUSION	Duration of Post operative hospital stay
1	7	NO	NO	NO	NO		7
2	7	NO	NO	NO	NO		9
3	8	NO	NO	NO	NO		6
4	10	NO	NO	NO	NO		7
5	18	YES	NO	NO	YES		18
6	10	YES	NO	NO	NO		7
7	9	NO	NO	NO	NO		8
8	10	NO	NO	NO	NO		8
9	10	NO	NO	NO	NO		9
10	9	NO	NO	NO	NO		7
11	9	NO	NO	NO	NO		7
12	10	YES	NO	NO	NO		7
13	6	NO	NO	NO	NO		9
14	7	NO	NO	NO	NO		6
15	8	NO	NO	NO	NO		6
16	9	NO	NO	NO	NO		8
17	9	NO	NO	NO	NO		6
18	9	YES	NO	NO	YES		8
19	6	NO	NO	NO	NO		7
20	7	NO	NO	NO	NO		8
21	8	NO	NO	NO	NO		7
22	7	NO	NO	NO	NO		8
23	6	NO	NO	NO	NO		8
24	15	YES	NO	NO	YES		23
25	9	NO	NO	NO	NO		7
26	6	NO	NO	NO	NO		8
27	8	NO	NO	NO	NO		6
28	6	NO	NO	NO	NO		6
29	10	NO	NO	NO	NO		8
30	6	NO	NO	NO	NO		8
31	18	YES	YES	YES	YES		17
32	9	NO	NO	NO	NO		8
33	7	NO	NO	NO	NO		6
34	9	NO	NO	NO	NO		7
35	8	NO	NO	NO	NO		7
36	7	NO	NO	NO	NO		8
37	5	NO	NO	NO	NO		8
38	9	NO	NO	NO	NO		9
39	7	NO	NO	NO	NO		9
40	5	NO	NO	NO	NO		6
41	6	NO	NO	NO	NO		9

Sr. No	Time to return to work	Biopsy report	o day
1	15	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MINIMAL PLEURAL EFFUSION
2	21	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MILD PLEURAL EFFUSION
3	15	SMALL CELL CARCINOMA	MINIMAL PLEURAL EFFUSION
4	20	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MINIMAL PLEURAL EFFUSION
5	25	MODERATE DIFFUSE ALVEOLAR CARCINOMA	MILD PLEURAL EFFUSION
6	24	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MILD PLEURAL EFFUSION
7	20	ASPERGILOSIS	MILD PLEURAL EFFUSION
8	12	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MINIMAL PLEURAL EFFUSION
9	12	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MODEARTE PLEURAL EFFUSION
10	19	CAVITATORY NECROSIS WITH INTRAALVEOLAR EXUDATION	MINIMAL PLEURAL EFFUSION
11	20	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MINIMAL PLEURAL EFFUSION
12	18	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MINIMAL PLEURAL EFFUSION
13	15	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MINIMAL PLEURAL EFFUSION
14	13	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MILD PLEURAL EFFUSION
15	15	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MINIMAL PLEURAL EFFUSION
16	17	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MILD PLEURAL EFFUSION
17	16	MODERATE DIFFUSE ALVEOLAR CARCINOMA	MINIMAL PLEURAL EFFUSION
18	15	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MINIMAL PLEURAL EFFUSION
19	14	ASPERGILOSIS	MILD PLEURAL EFFUSION
20	20	CYSTIC TERATOMA	MINIMAL PLEURAL EFFUSION
21	14	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MILD PLEURAL EFFUSION
22	25	DIFFUSE ALVEOLAR DAMAGE WITH HYALINE MEMBRANE FORMATION	MINIMAL PLEURAL EFFUSION
23	20	GRANULOMATOUS INFLAMMATION	MINIMAL PLEURAL EFFUSION
24	35	SMALL CELL CARCINOMA WITH ASPERGILOSIS	MODEARTE PLEURAL EFFUSION
25	15	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MINIMAL PLEURAL EFFUSION
26	20	SMALL CELL CARCINOMA WITH ASPERGILOSIS	MINIMAL PLEURAL EFFUSION
27	14	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MINIMAL PLEURAL EFFUSION
28	15	CAVITATORY NECROSIS WITH INTRAALVEOLAR EXUDATION	MILD PLEURAL EFFUSION
29	11	CAVITATORY NECROSIS WITH INTRAALVEOLAR EXUDATION	MINIMAL PLEURAL EFFUSION
30	15	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MINIMAL PLEURAL EFFUSION
31	25	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE WITH ASPERGILLOSIS	MODERATE PLEURAL EFFUSION
32	16	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MILD PLEURAL EFFUSION
33	13	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MILD PLEURAL EFFUSION
34	15	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MILD PLEURAL EFFUSION
35	15	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	NINIMAL PLEURAL EFFUSION
36	25	ALVEOLAR DILATATION AND EMPHYSEMATOUS CHANGES	MINIMAL PLEURAL EFFUSION
37	14	CAVITATORY NECROSIS WITH INTRAALVEOLAR EXUDATION	MINIMAL PLEURAL EFFUSION
38	30	ZYGOMYCOSIS	MODERATE PLEURAL EFFUSION
39	18	GRANULOMATOUS INFLAMMATION WITH ZN STATINING POSITIVE	MILD PLEURAL EFFUSION
40	15	NON SMALL CELL CARCINOMA	MINIMAL PLEURAL EFFUSION
41	5	ASPERGILOSIS WITH GRANULOMATOUS INFLAMMATION	MINIMAL PLEURAL EFFUSION

Sr. No	3rd day	At time of follow up	Need for readmission within 1 month	Need for reintervention	Outcome
1	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
2	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
3	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
4	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
5	MINIMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
6	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
7	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
8	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
9	MILD PLEURAL EFFUSION	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
10	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
11	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
12	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
13	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
14	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
15	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
16	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
17	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
18	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
19	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
20	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
21	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
22	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
23	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
24	MILD PLEURAL EFFUSIONS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
25	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
26	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
27	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
28	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
29	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
30	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
31	MILD PLEURAL EFFUSION	MINIMAL LUNG FIELDS	NO	NO	DISCHARGED ON REQUEST
32	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
33	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
34	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
35	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
36	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
37	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
38	MILD PLEURAL EFFUSION	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
39	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
40	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED
41	NORMAL LUNG FIELDS	NORMAL LUNG FIELDS	NO	NO	DISCHARGED

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No. BFUHS/2K21p-TH/ 196 Date 6/11/2022

The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Diksha**, a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
To study the clinical spectrum and outcome of video assisted thoracoscopic pulmonary resections.

Supervisor
Dr. Atul Mishra
Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

Co-Supervisor

Dr. Ravinder Pal Singh
Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

Dr. Amandeep Singh Nar
Asst. Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

S P Singh

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

125. If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.

126. The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.

TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

IN

GENERAL SURGERY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

MARCH 2021

DR. DIKSHA

DEPARTMENT OF GENERAL SURGERY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS
For the degree of	M.S. (GENERAL SURGERY)
Name of the candidate	Dr. Diksha
Supervisor	Dr. Atul Mishra, Professor, Surgery, Department of Surgery, DMC&H Ludhiana
Co-supervisor	Dr. Ravinder pal Singh, Professor, Department of Surgery, DMC&H Ludhiana Dr. Amandeep Singh Nar, Associate Professor, Department of Surgery, DMC&H Ludhiana
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: The study will be conducted in DMCH for period of 1 and half year in patients admitted with various benign and malignant lung pathologies. The patients will undergo Video Assisted Thoracoscopic Pulmonary Resections. In this study we will analyze the clinical spectrum and outcome of pulmonary resections including complications which can be intraoperative and postoperative, duration of chest tube drainage, need of analgesics and duration of hospital stay. The results will be statistically analyzed.

Aim of Study: 1) To study the clinical spectrum and outcomes of VATS pulmonary resections.

Materials & Methods: This study will be conducted in department of surgery, Dayanand Medical College and Hospital for one and half year. All the patients will be informed about the procedure of VATS in detail and surgery will be performed after taking written and informed consent from each patient. Relevant present and past history will be recorded. Intraoperative and postoperative data will be collected for all patients and data will be recorded in proforma for analysis and interpretation of data.

Clinical Significance: To study the clinical spectrum and outcome of VATS pulmonary resections including the intraoperative and postoperative complications and 30 days follow up.

Keywords: Video Assisted Thoracoscopic Surgery (VATS)

(Signature)	(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS"** exist in the Department of General Surgery DMC&H, Ludhiana and will be provided to be candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

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Professor
Department of Surgery
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Co-Supervisor(s)

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Professor
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Dr. Amandeep Singh Nar
Associate Professor
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HEAD OF DEPARTMENT

Dr. Jaspal Singh
Professor and Head
Department of Surgery
DMCH, Ludhiana

Place: _____

Date: _____

APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Diksha
Department	General Surgery
Topic of Thesis	TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS
Likely date of appearing in PG examination	MAY 2023
Date of enrollment	31st July 2020
Name of Head of Department	Dr. Jaspal Singh
1) Supervisor **2) Co-Supervisor**	Dr. Atul Mishra Dr. Ravinder pal Singh Dr. Amandeep Singh Nar
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)	Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / No

Dr. Sandeep Puri
Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	Dr. Diksha V.P.O Saniana, Teh. Tohana, Dist. Fatehabad, State Haryana
2	NAME OF THE INSTITUTE	Dayanand Medical College And Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	M.S General Surgery
4	DATE OF ADMISSION OF COURSE	31st July, 2020
5	TITLE OF THE TOPIC	TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS"

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Previously it was believed that “big surgeons make big incisions”. This adage was meant to convey that surgeon should never be struggling while operating due to small incision. But with the development of endoscopic video systems this scenario has been changed. The development of minimally invasive surgery has evolved constantly in last 20 years. The advantage of this technique is that it reduces the surgical trauma response and optimizes the patient recovery without compromising results.[1] The tremendous success of laparoscopic surgery in the late 1980s and early 1990s gave impetus to thoracic surgeons to apply this technology on the other side of the diaphragm. The first pulmonary lobectomy performed by Video Assisted Thoracic Surgery (VATS) took place in Milan in the early 1990’s.[2] After this there is continuous evolution in close association with technical advancements in imaging techniques and refinement of surgical instruments, which made room for new indications for VATS. The another milestone was the Introduction of a “cold” halogen light source in enhancing the visualization of anatomical structures. This was a major development in VATS since up to 50% of the light would absorb by the blood in the operation field. Another major step in VATS development was introduction of endostaplers. Presenting endostaplers guided by VATS opened the way for effective and safe lung parenchyma through a small incisions. From then on, video-assisted thoracoscopy (VATS) has been gaining popularity in thoracic surgery not only in diagnosis, but also in the management of pneumothorax, resection of small pulmonary nodules, thoracic injuries, benign and malignant pathologies. However, initially there was controversy using VATS in anatomical lung resection from oncological standpoint but later VATS lobectomy as an oncologic resection came in view and large retrospective studies showing the feasibility and safety of this minimally invasive surgical approach.[3] Pulmonary resections done by VATS are routinely performed in hospitals all over the world and the various studies that have been conducted report

increasingly complex surgeries such as video assisted thoracoscopic lobectomy with bronchoplasty has increased in recent years.[4] The superiority of VATS stems from the fact that it provide a magnified panoramic view of hemithorax. It also offers the opportunity to lyse adhesions, take adequate biopsies, drain fluid and to concomitant pulmonary, pericardial and mediastinal diseases. There is impairment of postoperative respiratory functions after thoracic surgery which results in developing postoperative complications. The most frequent risk factors for complications following the thoracic surgery include age, cardiovascular comorbidities, smoking and COPD.[5] VATS has multiple advantages over open thoracotomy including shorter hospital stay, less postoperative pain, less need of analgesics, early recovery of pulmonary function test in patients especially with chronic obstructive pulmonary diseases and the elderly and overall reduced cost.[6-8] Also patients who undergo VATS have more strength to tolerate chemotherapy. As a result, theoretically, there will be more survival benefit if chemotherapy is started immediately after surgery.[9]

Video assisted thoracoscopic surgery is finding an ever increasing role in diagnosis and treatment of various thoracic disorders that previously required open thoracotomy. Despite this, its implementation in developing country like India become difficult due to high equipment cost due to use of specialized thoracoscopic instruments, longer operative room times and steeper learning for the surgeons and operating room personnel.

Therefore still, we do not have enough data from studies conducted in India that confirm the applicability and technique in our country taking into account the particular characteristics of the patient and centres that provide care to them.[1,8] The primary objective of our study is to study the clinical spectrum and outcome of VATS pulmonary resections including the intraoperative and postoperative complications, need for analgesics, need for blood transfusion, chest tube drainage time, need for open thoracotomy and 30 days follow up.

6.2 REVIEW OF LITERATURE

With the introduction of keyhole surgery in 1980's minimum invasive surgery was quickly adapted and adopted for surgery in thoracic cavity. [10] Progress had been swift with establishment of VATS which is well established technique in armamentarium of thoracic surgeon. Over the past two decades there is revolution in management of many pulmonary and cardiac diseases due to this technique. Thoracoscopic inspection of pleura, while the patient was under local anaesthesia, was first performed by Swedish physician Jacobaeus (1910). He used a single cystoscope with a rigid working channel and an illumination source at its end. This procedure was done to treat the pleural effusion in patient suffering from tuberculosis. With the development of fibre optic light there is advancement of all forms of minimal access surgery.

Over the decades, indications of VATS were expanded. Two periods are noteworthy; the period between 1992 and 2002, when indications for VATS were mainly diagnostic procedures such as lung biopsy, pleural biopsy, mediastinal biopsy and small thoracic surgical procedures such as pneumothorax surgery, sympathectomy, and another is the period from 2002 to present, when VATS has been used for various surgical procedures such as lobectomy, pneumonectomy etc. There were two important breakthroughs after which there was improvement in the technique of treatment performance. The first one was the introduction of separate lung ventilation the advantage of which is that procedures can be conducted with a non-ventilated lung. The second one was the introduction of video camera techniques to the surgical optic which allows the magnified image to be transferred to a TV screen. It was then that the abbreviation video-assisted thoracic surgery (VATS) started to be used in thoracic surgery.[11] Later many studies described this technique for pleurectomy and thoracic sympathectomy as well as for wedge resections for pulmonary nodules. Shortly thereafter, first descriptions of lobectomies and pneumonectomies appeared.[12] Early evidence confirmed that patients who underwent resections via VATS approach experience less postoperative pain more rapid recovery and better cosmetic results

than open thoracotomy by G Roviaro et al (2004).[13] Gianluca Casali et al (2008) concluded that VATS lobectomy is less expensive than conventional lobectomy and increase theatre costs are counterbalanced by shorter hospital stay and less complications.[14]

Prospective study conducted by Sandra C omaszek et al (2009) on 56 patients concluded that VATS lobectomy is safe and feasible for pulmonary resections. Median hospital stay time was 4 days and median chest tube removal was 2 days with no operative mortality.[15]

Retrospective study by Christopher W Seder et al (2009) concluded that thoracoscopic lobectomies increased from 16% to 49% whereas open lobectomies decreased from 81%to 42%, they also concluded that established thoracic surgeons can safely incorporate thoracoscopic lobectomy with no increase in morbidity and mortality. [16]

Raja M Flores et al (2011) studied about the catastrophic complications and concluded that incidence of intraoperative complications are low but when they do occur can be managed. However complications can be avoided by enhanced knowledge of anatomy and careful dissection.[17] However certain studies also shows that the rate of postoperative and intraoperative complications in their series is similar to that of others. However, the thoracoscopic approach seems to be producing unusual accidents, such as lobar torsions or anatomic mistakes as reported in other series. Even large studies fail to determine the real rate of intraoperative complications, which are most likely underestimated by Ludovic Fournel et al (2013).[18] Mitsunori Higuchi et al (2014) studied the diseases free interval and overall survival were not inferior after VATS lobectomy compared with their conventional counterpart. Local control was significantly better after VATS than open thoracotomy however there was insufficient accuracy for preoperative staging.[19] In a study conducted by Hee Suk Jung et al (2015) to know the clinical feasibility and efficacy of VATS anatomical resection, 465 patients underwent anatomical pulmonary resection and systematic mediastinal lymph node sampling or dissection for central lung cancer. 69 patients of the thoracotomy group and 64 of the VATS group underwent lobectomy, bi lobectomy was performed in 19

patients of the thoracotomy group and 21 of the VATS group, and segmentectomy in 3 patients of the VATS group and he concluded that there were no differences in the anatomical distribution of pulmonary resections between the two groups no operation related in-hospital mortality was there. There were 34 postoperative complications in 30 patients, without significant differences between the two groups. The median hospital stay and chest tube indwelling period of the VATS group were shorter than those of the thoracotomy group by 2 days and 1 day, respectively (P<0.05). There was no difference between the two groups in 3-year recurrence-free or overall survivals (OS) during a median follow-up of 32.5 months (range, 0.5-95.8 months).[20] Martin Reichert et al (2016) analyzed two groups retrospectively first group underwent VATS anatomic lung resections for benign diseases (VATS-B) and another group underwent VATS anatomic lung resections for early stage NSCLC (VATS -N). VATS-B was subdivided by operation time and underlying diseases and subgroups were compared to VATS -N group. Three patients from VATS-B and four from VATS-N experienced conversion to open surgery. Causes of conversion in VATS-B were intraoperative complications, whereas conversions in VATS-N were elective for oncological concerns ($p < 0.05$). Duration of postoperative mechanical ventilation and operation time were longer by tendency; chest tube duration and postoperative stay on intensive care unit were significantly longer in VATS-B. Subgroup analyses showed a longer operation time as a predictor for worse perioperative outcome regarding postoperative mechanical ventilation, postoperative stay on intensive care unit, chest tube duration, and length of hospital stay. There were more postoperative complications in patients with longer operation time. Differences in perioperative outcome data were not significantly dependent on the underlying benign diseases compared to VATS.[21] A study on anatomic pulmonary resection via VATS conducted in Brazil by Stephan Adamour et al (2017) and concluded that out of 117 cases number of lobectomies peformed were 98, 19 segmentectomies mean age of patients was 63.8 years with female dominated. The mean time to chest tube removal was 2.47 days, mean

length of hospital and ICU stay were 4.48 and 1.88 days respectively. Conversion to thoracotomy was required in 4 day with bleeding average >400ml occurred in 15 patients. [22] Benoit Bedat et al (2018) studied about the clinical outcome and risk factors for complications after pulmonary segmentectomy by video assisted thoracoscopic surgery in 129 patients and concluded that VATS segmentectomy for primary lung tumors (100), metastases (16) and benign lesions (13). The overall 30-day mortality and morbidity rates were 0.8% and 31%, respectively. The reoperation rate was 4.7% and the indications were hemothorax 2, prolonged air leak (PAL) 2, segmental torsion 1, empyema 1. Chest drainage lasted for a median of 2 days (range, 1–33 days) and patients got discharged from the hospital after a median of 6 days (range, 2–37 days). Postoperative complications were mainly associated with smoking pack-years >50 units and chronic obstructive pulmonary disease (COPD). Nine patients (9%) presented with distant recurrences. Nodule size >2 cm was associated with decreased disease-free survival (DFS) (P=0.04). There was no association between surgical experience in VATS segmentectomy and DFS or postoperative complications.[23] Tuo Xing et al (2019) studied the effect of early removal of chest tubes in two groups divided on basis of drainage time: first group was those in whom the chest tube was removed within 48 hours and the second group was traditional management group and concluded that the hospital stay in the early removal group was significantly shorter (5.05±2.27 *vs.* 7.17±3.03) compared with the traditional management group. Regarding complications, the rates of both lung infection and no complication in the early removal group were less (0.2% *vs.* 2.3%, 93.0% *vs.* 91.1%), and the necessity of re-operation was also less (0% *vs.* 1.2%) when, compared with the traditional management group. Regarding both pleural effusion and thoracentesis, a slight increase in the patient number was observed in the early removal group compared with the traditional management group 4.7% *vs.* 4.0%, 1.2% *vs.* 0.9%).[24]

6.3 AIMS AND OBJECTIVES OF THE STUDY

To study the clinical spectrum and outcomes of VATS pulmonary resections.

7.0 MATERIALS AND METHODS

This study will be conducted in department of Surgery, Dayanand Medical College and Hospital for one and half year. All the patients will be informed about the procedure of VATS in detail and surgery will be performed after taking written and informed consent from each patient. Relevant present and past history will be recorded. Intraoperative and postoperative data will be collected for all patients and data will be recorded in proforma for analysis and interpretation of data.

7.1 SOURCE OF DATA

Patient attending outpatient and inpatient in department of surgery, Dayanand Medical College and Hospital will constitute the source of data.

7.2 METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

1) Patients who are fit for VATS pulmonary resections done for various benign and malignant pathologies.

2) Various procedures included are as follows:

- Pneumonectomy
- Lobectomy
- Segmentectomy
- Wedge resections

EXCLUSION CRITERIA

The following group of patients will be excluded from the study:

- Haemodynamically unstable patients
- Bleeding disorders
- Advanced carcinoma of lung
- Cardiovascular insufficiency

DURATION OF STUDY: The study will be conducted for one and half year from 1st March 2021 to 31st Aug 2020 including one month follow-up.

Outcome:

After the patients undergo surgical intervention clinical outcome of patients will be analyzed with respect to following:

Patient demographics

- Age
- Gender
- Diagnosis
- Comorbidities like chronic obstructive pulmonary diseases, coronary artery diseases, diabetes mellitus etc.
- History of smoking
- Previous treatment if taken
- Previous surgery if done

Surgical related data

- Preoperative assessments like PFT'S, CT, Chest XRAYS etc.
- Type of surgery
- Duration of surgery
- Intraoperative complications
- Need for blood transfusion
- Need for open thoracotomy

Surgery results

- Length of hospital stay
- Postoperative analgesic requirement
- Postoperative complications like air leak, bleeding etc.
- Duration of chest tube drainage
- Need for readmission within 1 month
- Need for reintervention
- Follow up for 1 month

Statistical Analysis: Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Yes

Patients included in study will undergo hematological, biochemical and radiological investigations as per the protocol. Written and informed consent will be taken from all patients included in study. These investigations are however essential for the patient management and are a part of routine protocol for management for thoracic pathologies.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Yes

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PROFORMA

Sr. No.

Patient demographics

- Name
- Age
- Gender
- Admission No
- MRD No
- Date of admission
- Date of surgery
- Date of discharge
- Occupation
- Address
- Chief complaints
- HOPI
- Past History

▪ Hypertension
▪ Diabetes mellitus
▪ Bronchial asthma
▪ Tuberculosis
▪ COPD
▪ History of smoking

Signature of Candidate **Signature of Supervisor**

▪ Bleeding disorders
▪ Others if any
▪ Previous treatment ▪ If yes .....
▪ Previous surgery ▪ If yes .....

GENERAL PHYSICAL EXAMINATION

- Sensorium
- Vitals

▪ BP
▪ Heart rate
▪ Respiratory rate
▪ Temperature
▪ Spo2
▪ Pallor
▪ Icterus
▪ Cyanosis
▪ Oedema
▪ Lymphadenopathy
▪ Clubbing

Signature of Candidate **Signature of Supervisor**

RESPIRATORY SYSTEM

▪ Inspection
▪ Palpation
▪ Percussion
▪ Auscultation

CARDIOVASCULAR SYSTEM

ABDOMEN

CENTRAL NERVOUS SYSTEM

- **PREOPERATIVE ASSESMENTS**

▪ Blood investigations 1. TLC 2. HB 3. Platelet Count 4. ABG 5. PTI/INR 6. Any other investigations according to comorbid condition
▪ Chest XRAY'S
▪ CT Chest (Date)
▪ Pulmonary function test

- **CLINICAL DIAGNOSIS**
- **SURGICAL RELATED DATA**
- Type of anaesthesia
- Type of surgery

Signature of Candidate **Signature of Supervisor**

- Duration of surgery (minutes)
- Use of stapler
- Biopsy taken / not taken
- Intraoperative complications

▪ Bleeding
▪ Need for blood transfusion
▪ Conversion of VATS to open thoracotomy If yes ……
▪ Others

Surgery results

- Postoperative pain by visual analogue scale

0 day
3rd day
7th day
1 month

- Postoperative analgesic requirement

Type	NSAIDS	OPIODS
Dose		
No of days		

- Chest tube drainage

Day of removal

- Postoperative complications

Signature of Candidate **Signature of Supervisor**

▪ Bleeding
▪ Air leak
▪ Need for blood transfusion
▪ Others

- Length of hospital stay _____ No of days

- Time to return to normal work
- Biopsy report
- Postoperative x ray

O day
3rd day
At time of follow up

- Need for readmission within 1 month yes/ no

- Need for reintervention yes/no
- Outcome

▪ Improved
▪ Cured
▪ Discharge
▪ DAMA
▪ Death

Signature of Candidate **Signature of Supervisor**

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....
.....am willing to participate in the study **"TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

.....
Signature of the patient

Name:

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____
गवाह के हस्ताक्षर
नाम:

_____
रोगी के हस्ताक्षर/अंगूठे का निशान
नाम:

_____
अन्वेषक के हस्ताक्षर

_____
विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"TO STUDY THE CLINICAL SPECTRUM AND OUTCOME OF VIDEO ASSISTED THORACOSCOPIC PULMONARY RESECTIONS" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ